The Use of Breathing Apparatus in the Fire Service

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Introduction

Preface

1. This publication replaces the guidance in "The Use of Breathing Apparatus in the Fire Service" dated December 1995, published by the Department of the Environment. The main differences between the two documents are:

   (a) the introduction of concepts associated with the Incident Command System including the risk assessment based approach;
   (b) the introduction of Bridgeheads;
   (c) the introduction of Rapid Deployment Procedures;
   (d) a change in the permitted number of BA wearers under Stage I Entry Control Procedures from 6 to 10 with a reduction in the permitted number of Entry Control Points under Stage I from two to one;
   (e) the introduction of Telemetry Equipment;
   (f) the introduction of Thermal Imaging Cameras;
   (g) the introduction of Aides Memoire;
   (h) greater clarification of the roles and responsibilities of individual officers and firefighters in the application of Breathing Apparatus (BA) command and control procedures,

2. A new page and paragraph numbering system has been introduced in this document. Sections and sub-sections can be located by page number from the contents pages. Pages within a section are prefaced by the section number and each sub-section of the document has individually numbered paragraphs. Text within the document can be specified by page number and paragraph number.

3. Elements of “The Use of Breathing Apparatus in the Fire Service” dated December 1995 not specific to BA command, control and communications have been excluded from this guidance. In particular information relating to Breathing Apparatus training is no longer contained in this document.

4. The Department of the Environment, Heritage and Local Government wishes to gratefully acknowledge the permission granted by the Controller of Her Majesty's Stationery Office to use extracts from "Technical Bulletin 1/1997 Breathing Apparatus Command and Control Procedures" in the preparation of this manual. Crown copyright is reproduced with the permission of the Controller of HMSO.

Aims and Objectives

1. BA is used in atmospheres that would be hazardous to health. Often the work undertaken in BA will be complex, physically and psychologically demanding and in circumstances where the normal sensory perceptions are denied. The wearer may face risk from hazards in addition to the irrespirable atmosphere, such as from fire, explosion or structural collapse. To reduce these risks to the lowest practicable level, command and control procedures are required. The procedures set out in this guidance must be adopted by all firefighters in all brigades at all incidents.

2. This guidance will allow the fire service to apply a risk-based approach to the wearing of BA. This requires the Incident Commander to identify, analyse and assess risks and select the appropriate BA procedures for risk control prior to committing personnel wearing BA. Fire Authorities must therefore ensure that officers are trained to make these decisions.

3. The use of standard procedures is essential to ensure:

   (a) the competent use of BA;
   (b) adequate support and emergency arrangements;
   (c) the safety of the individual BA wearer;
   (d) the safety of other BA wearers at the same incident; and
   (e) the successful conclusion of operational incidents.

4. The procedures adopted for operational incidents apply equally during training. In recognition of the risks likely to be faced by BA wearers, only those firefighters who have satisfactorily completed a BA Initial Wearers' Course should be allowed to use BA for operational duties.

5. The procedures in this manual must be reinforced by appropriate training designed to develop and maintain the professional competence and safety of firefighters, officers and others with a role in using BA and its associated equipment, and to secure the effective implementation of the procedures.

6. In complying with the procedures in this manual Fire Authorities should have regard for BA manufacturers' instructions for use and maintenance.

Legislation

Legislative requirements to note include:

Fire Services Act 1981

The Act requires Fire Authorities to fulfil certain functions:

Section 10.2.a — to make provision for the prompt and efficient extinguishing of fires in buildings and other places of all kinds in its functional area and for the protection and rescue of persons and property from injury by fire.

Section 10.2.b — to establish and maintain a fire brigade, provide premises and make such other provision as it considers necessary or desirable for such purposes.

Section 15.1 — It shall be the duty of a fire authority to make arrangements for the efficient training of personnel of its fire services.

Fire Authorities (Emergency Operations) Regulations 1987

The Minister for the Environment, in exercise of the powers conferred on him by section 27(4) of the Fire Services Act 1981 hereby makes the following Regulations:

Article 2 — "Emergency operations" means operations of an emergency nature under section 25 of the Fire Services Act 1981 other than operations for extinguishing a fire.

Article 3 — Every fire authority shall -

(a) appoint an officer of the authority to be the person who shall be in charge of and shall control emergency operations of the authority, and

(b) appoint an officer of the authority to be in such charge and control in the absence of such first mentioned officer.

Article 4 Where a fire authority is carrying out emergency operations in its functional area and the person appointed under article 3(a), or in his absence the person appointed under article 3(b), shall have sole charge and control of the operations and the operations of other fire authorities providing assistance in its functional area.

Safety, Health and Welfare at Work Act 2005

The Act requires fire authorities to make suitable and sufficient assessment of the risks to health and safety of firefighters to which they are exposed while on duty and includes the following sections:

Section 8.1 Every employer shall ensure, so far as is reasonably practicable, the safety, health and welfare at work of his or her employees.

Section 8.2 The employer's duty extends, in particular, to the following:

Section 8.2.a managing and conducting work activities in such a way as to ensure , so far as is reasonably practicable, the safety, health and welfare at work of his or her employees.

Section 8.2.e providing systems of work that are planned, organised, performed, maintained and revised as appropriate so as to ensure, so far as is reasonably practicable, the safety, health and welfare at work of his or her employees.

Section 8.2.g providing the information, instruction, training and supervision necessary to ensure, so far as is reasonably practicable, the safety, health and welfare at work of his or her employees.

Section 8.2.i having regard to the general principles of prevention, where risks cannot be eliminated or adequately controlled or in such circumstances as may be prescribed, providing and maintaining such suitable protective clothing and equipment as is necessary to ensure, so far as is reasonably practicable, the safety, health and welfare at work of his or her employees.

Section 8.2.j	preparing and revising, as appropriate, adequate plans and procedures to be followed and measures to be taken in case of an emergency or serious imminent danger.

Regulations

Safety, Health and Welfare at Work (Confined Spaces) Regulations, 2001 (S.I. No. 218 of 2001).

Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001 (S.I. No. 619 of 2001).

Safety, Health and Welfare at Work (Explosive Athmospheres) Regulations, 2003 (S.I. 258 of 2003).

Safety, Health and Welfare at Work (General application) regulations, 1993 (S.I. 44 of 1993).

Carriage of Dangerous Goods by Road Regulations, 2004 (S.I. No. 29 of 2004).

Abbreviations

The following abbreviations are used in this manual:

ADSU	Automatic Distress Signal Unit
BA	Breathing Apparatus
DSU	Distress Signal Unit
DSX	see ADSU
ECB	Entry Control Board
ECO	Entry Control Officer
ECP	Entry Control Point
ECU	Entry Control Unit
OIC	Officer-in-Charge
IC	Incident Commander
MC	Main Control
MCO	Main Control Officer
MCP	Main Control Point
RDB	Rapid Deployment Board
RDSU	Radio Distress Signal Unit
TIC	Thermal Imaging Camera
TOW	Time of Whistle
TTW	Time to Whistle

Glossary of Terms

The following definitions apply to this guidance:

Access Point / Exit Point
The opening into a building or structure through which BA teams enter or exit the risk area.

Automatic Distress Signal Unit (ADSU)
A Distress Signal Unit (DSU) that includes an automatic alarm function.

Breathing Apparatus (BA)
Self contained respiratory protective equipment.

Breathing Apparatus Team
A number of BA wearers designated to work together in the risk area.

Bridgehead
The position, in safe air, where entry control procedures are established within a structure at a distant point from open air.

Cylinders
Compressed gas / air containers of varying shape and size used in conjunction with BA or airline equipment.

Distress Signal Unit (DSU)
A distress signal unit is attached to all BA sets. It is a manually operated unit designed to provide an audible emergency alarm to alert others that a BA wearer is in distress. (see ADSU)

Emergency Team
A number of BA wearers designated to standby at the entry control point(s) for emergency purposes.

Entry Control Board (ECB)
See page 4-8.

Entry Control Officer (ECO)
A BA wearer nominated to monitor the wearing of BA through an ECP.

Entry Control Point (ECP)
The position for monitoring and controlling BA use, and access to and from the risk area where BA is used.

Entry Control Unit (ECU)
A telemetry radio base station configured similar to an ECB.

Exit Point / Access Point
The opening into a building or structure through which BA teams enter or exit the risk area.

Full Duration
The period during which BA is expected to provide respiratory protection from the moment the cylinder valve is opened until the cylinder content is exhausted.

Incident Commander (IC)
The Incident Commander will normally be the senior officer present at an incident according to each Brigade's policy determining rank and responsibilities at incidents. On occasion a more senior officer may choose to attend an incident as an observer. That officer will have overall responsibility for the incident, but need not assume the role of Incident Commander.

Main Control (MC)
An additional level of control required to oversee the requirements of Stage II procedures demanded by the circumstances of a large protracted BA incident.

Main Control Point (MCP)
The position for monitoring and controlling BA use where BA Main Control is used.

Normal Working
The remaining working duration when the safety margin has been deducted from the full duration of a cylinder(s).

Officer-in-Charge (OIC)
The Officer-in-Charge of personnel, fire station and/or equipment, e.g. crew, watch, appliance.

Portable Unit
A battery powered telemetry unit incorporating an integral radio transmitter and receiver connected to a BA set which can transmit and receive data from the Entry Control Unit (ECU).

Radio Distress Signal Unit (RDSU)
A combined radio telemetry portable unit and ADSU.

Rapid Deployment Procedure
The control procedure used in exceptional circumstances when BA has to be deployed immediately and resources are limited.

Risk Area
That part of the incident area to which BA entry control procedures should be applied.

Route
Each "access point" to a building provides a maximum of two routes into the risk area i.e. left or right.

Safe Air
An environment where the air is breathable and will not be harmful without the use of respiratory protection.

Safety Margin
The period during which the low pressure warning whistle operates.

Stage I Procedure
The level of control required to monitor the wearing of BA at small incidents which are not likely to be protracted, where there are no more that 10 wearers and a minimum of 1 entry control board.

Stage II Procedure
The level of control required to monitor the wearing of BA at incidents which are likely to be protracted, where there are more than 10 wearers or 2 entry control boards are in use, or where branch guidelines are used.

Team Leader
A breathing apparatus wearer designated to lead a team of BA wearers.

Time to Whistle

"Time to Whistle" is a feature available with telemetry equipment. In addition to indicating the estimated "Time of Whistle", telemetry equipment can display the estimated number of minutes left before Whistle Activation.

Working Duration

The period during which BA is expected to provide respiratory protection from the moment the cylinder valve is opened until the moment at which the low-pressure warning whistle starts to operate.

Section 1: Control Procedures

Introduction

Objectives

To ensure the safety of firefighters and the effective use of Breathing Apparatus (BA) during training and operations.

To meet the different and varying demands of incidents.

To outline the resources available to the Incident Commander.

1. To ensure safe operations whilst using BA it is essential that effective control procedures are employed. Control procedures must be implemented as soon as the decision is taken to use BA.

2. The control procedures described in this section are designed to form a single progressive system for managing BA operations. The procedures for "Stage I" and Stage II" have been retained to denote different levels of control that may be applied to differing demands and resources. It is recognised that there may of necessity be occasional circumstances when the full control procedures are unable to be implemented. To address this, procedures for the rapid deployment of firefighters are set out within this guidance.

Note: Rapid deployment procedures should only be used in exceptional circumstances; where urgent action is required and a limited number of crew members form the initial attendance.

3. On arrival at an incident, the Incident Commander will need to assess the risk and the available resources and apply the appropriate level of control procedures. The procedures applied may change with the gravity or complexity of the incident but, whenever BA is in use, a control procedure must be in place which is sufficient to monitor the risk to the safety of BA wearers. The level of control adopted will apply to the whole incident and should not vary for different sectors or access points into the risk area. The standard procedures will be used in all cases.

4. As soon as resources permit, rapid deployment procedures should be replaced by the full requirements of the Stage I procedures. If an incident is seen to be large or is likely to be protracted, Stage II procedures may need to be introduced immediately. In such cases the Incident Commander may decide to await reinforcements before committing personnel if the initial resources are deemed inadequate to proceed safely.

5. Particular attention is given in this guidance to the use of Entry Control Points (ECPs) and the duties of the Entry Control Officers (ECOs) in implementing procedures. All firefighters are required to maintain their understanding and use of these procedures whenever BA is in use for training and operations.

BA Entry Control Points (ECPs)

Objective

To secure focal point(s) for the effective management of Breathing Apparatus (BA) incidents and the safe control of access to, and egress from, the risk area.

1. Entry Control Officers (ECOs) are to be nominated for each Entry Control Point (ECP). Their duties depend upon the procedures adopted (see notes on Stage I page 1-7 and Stage II page 1-13).

   The siting and number of BA ECPs should take account of:

   a. the size of the risk area;
   b. the location of access points to the risk area;
   c. the number of levels or floors involved;
   d. wind direction;
   e. the physical limitations of the site, in particular, the obstruction to firefighting and effective control that can exist if the site is divided by major roads, railways or rivers or other physical barriers; and
   f. the likely development of the incident.

2. The ECPs should be sited:

   a. as near the scene of operations as is commensurate with safety so that the maximum duration of the BA can be used;
   b. in safe air in such a position that should the incident deteriorate it will not be necessary to relocate the ECPs (see "Bridgeheads" page 1-4); and
   c. so that the position of the ECO is easily located by all BA wearers.

3. The Incident Commander should be aware of the position of all ECPs.

4. The number of ECPs should be the minimum necessary to deal with the incident effectively. Additional ECPs should not be established merely because teams enter the risk area using different equipment or access points to a building unless they are so widely separated as to make the use of one ECP impracticable.

Bridgeheads

Objective

To provide a central and advanced control point for occasions where it is necessary for the use of Breathing Apparatus (BA) to be initiated at a distance from the original point of entry to a risk area, whilst remaining in a safe air environment.

Notes on Bridgeheads

1. Under normal circumstances before entry is made into a risk area using BA, an external position close to the access point into the building or structure is usually designated as the Entry Control Point (ECP). However, as part of operational planning, there may be some occasions when it is operationally necessary to enter a building or structure and to proceed some distance away from the original access point before initiating use of BA. Examples, which may require such an approach, include tunnels, complex major developments, ships or high-rise building incidents. Under such circumstances, the Incident Commander must make an assessment on whether and where to establish a bridgehead and ECPs. In reaching this decision the following factors should be taken into account:

    a. the immediate operational considerations;
    b. the need to initiate use of BA in safe air;
    c. whether there are any shorter and safer access routes to the incident;
    d. the safety of all personnel working ahead of the bridgehead;
    e. the need for effective communications between the bridgehead, BA control, BA teams and the Incident Commander;
    f. the distance from the initial access point to the bridgehead;
    g. the availability and location of BA relief and emergency teams;
    h. security of access to and egress from bridgeheads and forward control points; and
    i. the need to consider use of a guideline laid from the initial access point to the bridgehead position.

2. Where a change in circumstances or conditions (such as escalation or deterioration) require a bridgehead to be relocated, the potential risk to the BA wearer should be recognised. BA wearers calculate their working duration on their cylinder content at the time and point of original entry into the risk area. It is therefore essential that BA wearers are informed immediately of any relocation of the ECB as this may extend the time taken for them to reach a place of safety on exiting the risk area.

3. Additional information on the use of Bridgeheads in High-Rise buildings is available in the Fire Services Council's, Junior Officer Handbook, page 4-14.

Rapid Deployment Procedures

Objectives

To apply a minimum safety control procedure where the crew members available are limited and where persons at great risk require urgent assistance, or where dangerous escalation of the incident can be prevented.

1. The objective may be met by maintaining a minimum record of elapsed time since entry of the Breathing Apparatus (BA) wearers to a risk area. As far as is practicable, the principles of the standard Stage I procedures should be extended to incidents requiring the rapid deployment procedure.

2. Rapid Deployment Procedures are for use in exceptional circumstances only. The procedures may be used only when the total number of BA wearers in the risk area does not exceed two, and:

    a. it is immediately clear that persons are at great risk and in need of rescue, and are either within view or known to be within a short distance of the access point; or

    b. dangerous escalation of the incident can be prevented by immediate and limited action.

3. Before entering the risk area BA wearers will ensure that tallies are attached to a "Rapid Deployment" Entry Control Board (ECB) so that the "Time In" is recorded automatically. A Rapid Deployment Board is included in Appendix 4.

4. As soon as practicable the Rapid Deployment Procedures shall be replaced by Stage I or Stage II BA control procedures. When transferring to Stage I or Stage II procedures, care should be taken to ensure that the BA tallies are effectively handled to ensure accurate and prompt recording and monitoring of BA wearers in the risk area.

Stage I Procedures

Objectives

To apply control procedures to meet the demands of small or limited incidents and to monitor the safety of Breathing Apparatus (BA) wearers.

Notes on Stage I procedures

1. The objectives are met by:

   a. ensuring all firefighters are aware that Stage I procedures are being applied;
   b. appointing an Entry Control Officer (ECO) to implement the procedures at the Entry Control Point (ECP);
   c. recording BA wearers entry (using their tallies) and monitoring their estimated air supply;
   d. ensuring effective communication between BA wearers and ECO;
   e. appropriate provision for relief and/or emergency teams; and
   f. applying the procedures for use of related BA equipment.

2. Stage I procedures apply where:

   a. the size of the incident is small and the use of BA is unlikely to be protracted;
   b. no more than one ECP is used; and
   c. the total number of BA wearers within the risk area does not exceed 10.

Note: Branch guidelines are not to be used under Stage I procedures.

3. The Incident Commander is responsible for nominating an ECO to monitor the implementation of Stage I procedures and establish an ECP to the risk area. During the application of Stage I procedures the Incident Commander is responsible for effectively monitoring the BA wearers/teams within the risk area and for ensuring that effective briefing and debriefing takes place.

Nomination of Entry Control Officers (ECOs)

4. The Incident Commander should nominate ECOs for each appliance equipped with an ECB (see "At the Fire Station" page 2-13). However, in all cases, the ECO must be an experienced BA wearer. On arrival at the incident, the nomination can be changed depending upon the nature of the risk and the competence, experience and rank of available personnel.

Duties of Stage I Entry Control Officers (ECOs)

1. Stage I ECO duties are restricted to those directly related to the monitoring of Breathing Apparatus (BA) wearers who have entered the risk area using the Entry Control Point (ECP) for which they are responsible. It may be necessary to have an officer rank close by to give direction as to firefighting requirements, equipment supply or casualty handling.

2. For identification purposes, ECOs must wear a black and yellow BA control tabard.

Monitoring Procedures

3. The ECO shall:

   a. take up the position nominated for the ECP by the Incident / Sector Commander;

   b. provide an Entry Control Board (ECB) complete with suitable waterproof marker (ECBs are shown in appendices 4 and 5);

   c. indicate clearly on the ECB that Stage I is in operation and ensure that the ECB is clearly sited;

   d. receive tallies of BA wearers and check that the name of the wearer and the cylinder content at the time of entry into the risk area are correct;

   e. enter the "Time In" on each tally;

   f. place each tally in a slot on the ECB so that the tallies of each team of wearers are together and are indicated as a team by bracketing the tallies using the waterproof marker (the earliest "time of whistle" being placed outside the bracket);

   g. calculate the "time of whistle" for each wearer by using the ECB clock and enter this in the appropriate section of the ECB, opposite the tally.

The time of whistle should be calculated by:

(i) taking account of the guidance given in " Withdrawal of BA Teams" page 2-10 paragraph 2 and "Incident Procedures" page 2-15 paragraph 2;

(ii) carefully referring to the correct section of the duration tables (Appendix 1) or using the dial calculator, noting both the cylinder pressure reading at entry and the type of cylinder/apparatus in use;

(iii) acting on the guidance of the Incident/Sector Commander if necessary, restrict the length of exposure in difficult or strenuous conditions. In such circumstances the BA wearer and team leader must be advised to withdraw from the risk area at a predetermined pressure gauge reading. The ECO should calculate the time of exit and make a note in the remarks column accordingly;

(iv) where appropriate, taking account of any elapsed time since entry of BA wearers who entered the risk area under the rapid deployment procedure.

Note: The "time of whistle" may be read directly where provided by an electronic contents gauge/indicator incorporated with the BA set.

i. indicate the location of teams in the column provided and record details in the "Remarks" and "Location of Teams" columns on the ECB as necessary;

j. where practicable, ensure BA wearers are appropriately pre-briefed prior to entry to the risk area (see "Duties of BA Team Leader page 2-8);

k. where a BA team re-enters a risk area (see "New Entry and Re-entry to an Incident" page 1-24), annotate the ECB;

l. when BA teams exit the risk area, remove their tallies from the ECB and return them to the respective wearers; and if appropriate, ensure that they are fully debriefed; and

m. keep the Incident / Sector Commander fully informed of all relevant developments or requirements related to the wearing of BA and the operational aspects of the incident, using information gained from BA wearers at the incident.

Miscellaneous Duties

4. The ECO shall:

a. whenever radio communications are to be used, carry out a radio communications check prior to entry into the risk area;

b. attach BA main guideline tallies to the appropriate line as necessary and remove them when the Incident Commander indicates that the line is no longer required;

c. inform the Incident / Sector Commander of any breakdown in radio communications with BA teams; and

d. notify the Incident / Sector Commander if it is considered necessary for BA teams to stand by at the ECP.

Emergency Procedures

5. The ECO shall:

a. commit an emergency team(s), if available, and immediately inform the Incident / Sector Commander of the incident if:

(i) any team fails to return to the ECP by the indicated "Time of Whistle" (indicated outside the brackets);
(ii) an ADSU is operated;
(iii) it is clear that a dangerous situation is developing which will affect the BA team; or
(iv) it appears that any BA wearer is in distress.

Note: If the Incident / Sector Commander is not available, the ECO shall initiate a radio assistance message, "BA Emergency".

b. prior to entry, ensure the emergency team is suitably briefed (see "Emergency Team" page 1-22 paragraph 4).

As soon as resources permit, a minimum of two BA wearers should be kept available at the ECP for emergency purposes.

Special Incident Duties

6. At incidents involving radiation or hazardous chemicals, liaise with the Decontamination Officer. When a radiation check is considered necessary by the Incident Commander, the ECO must ensure that all personnel are fully briefed on entering the risk area, and fully debriefed, if appropriate on exit.

7. The ECO must also enter the dosimeter reading on the reverse of the tally on entry of the wearer and (whist wearing appropriate protection) check the dosimeter reading and record it on the reverse of the tally when they leave the risk area. A permanent record of the exposure of each wearer to radiation should be made and passed to the Incident Commander at the conclusion of the incident.

Note: UK Technical Bulletin 2/1993 gives guidance on procedures at incidents involving radioactive materials.

Stage II Procedures

Objectives

To apply control procedures to meet the demands of "larger" and "more complex" incidents and to monitor the safety of Breathing Apparatus (BA) wearers.

Notes on Stage II procedures

1. These objectives are met by:

   a. ensuring that all firefighters are aware that Stage II procedures are being implemented;

   b. appointing an Entry Control Officer (ECO) to implement the procedures at each Entry Control Point (ECP);

   c. recording BA wearers entries (using their tallies) and monitoring their estimated air supply;

   d. ensuring effective communication between BA wearers and ECOs;

   e. appropriate provision for relief and/or emergency teams; and

   f. the application of procedures for use of related BA equipment.

Application of Stage II Control Procedures

2. Stage II entry control procedures normally supersede Stage I procedures and are used where one or more of the following apply:

   a. the scale of the operations is likely to be protracted or demand greater control and supervision than is provided by Stage I procedure;

   b. more than one Entry Control Point is necessary;

c. more than ten BA wearers are committed into the risk area at one time; or

d. branch guidelines are used.

Duties of the Incident Commander

3. The Incident Commander is responsible for overseeing the implementation of Stage II procedures and establishing Stage II entry control at every ECP into the risk area. During transition from Stage I to Stage II procedures care should be taken to ensure that the number of BA wearers whose entry control tallies supervised by an ECO (on one or more ECBs) does not exceed ten (excluding the emergency team).

Nomination of Entry Control Officers (ECOs)

4. Stage II ECOs are required to supervise each ECP. The Incident Commander should nominate ECOs for each appliance equipped with an ECB (see "At the Fire Station page 2-13). However, on arrival at an incident, the Incident Commander will need to give careful consideration to the complexity of the incident before confirming the personnel selected as ECOs. In broad terms, the greater the complexity of the incident the greater the rank needed for ECO duties. However, in all cases, the ECO must be an experienced BA wearer.

5. In circumstances where it has not been either necessary or possible for the Incident Commander to appoint an officer to manage operational requirements at the ECP, the ECO should be above the rank of firefighter. An additional ECO (any rank) should be appointed for each additional group of ten BA wearers entering a risk area through the same ECP. If practicable, and where resources permit, a firefighter should be appointed to assist the ECO, especially when several BA teams are being monitored at the same time.

Duties of Stage II Entry Control Officers

1. The duties of a Stage II ECO include all those specified for a Stage I ECO (see "Duties of Stage I ECO page 1-9). Additionally, the Stage II ECO's duties also include those listed below.

Monitoring Procedures

2. The ECO shall:

   a. ensure the Entry Control Board (ECB) indicates that Stage II procedures are being applied;

   b. check the "Time of Whistle" calculations of the Stage I ECO if being relieved;

   c. ensure BA teams are relieved at the scene of operations in sufficient time to allow their return to the Entry Control Point (ECP) by the "Time of Whistle";

   d. have available (at least 5 minutes before they are due to enter) sufficient relief teams to allow pre-entry checks and briefing to be completed without delaying their entry;

   e. liase (by radio, runner, etc.) with other ECPs;

   f. inform other ECPs of the names of BA wearers who leave the risk area other than via the ECP at which they entered;

   g. liase with a Main Control, and ensure that personnel who have collected their tallies report if required to Main Control following necessary debriefing at the ECP;

   h. ensure, if it becomes necessary to use additional ECBs, that tallies remain on the initial ECB under the control of the ECO (tallies must not be transferred to a second ECB, wearers must collect their tallies before the initial ECB can be disestablished); and

   i. synchronise the clock of the Stage II ECB and the Main Control clock to the clock on the first ECB used.

Miscellaneous Duties

3. The ECO shall:

   a. nominate BA communications teams and communications operators as necessary;

   b. attach BA main and branch guideline tallies to the appropriate line as necessary, remove them when the Incident Commander considers that the line is no longer required, and annotate the ECB with details of which team has been committed on which line (see "Guideline Procedures page 1-27); and

   c. at cross-border incidents, be alert to potential monitoring issues (see "Incidents in other Fire Authority areas" page 1-25).

Emergency Procedures

4. The ECO shall:

   a. have a minimum of one emergency team of two BA wearers standing by for every ten BA wearers committed to the risk area.

   b. have, where resources are available, a fully equipped emergency BA team (see "Emergency Teams" page 1-22) rigged and standing by at the ECP throughout the period that it is in operation.

5. Stage II ECO duties are restricted to those related directly to the BA function. It may therefore be necessary to have an officer close by to give directions as to firefighting requirements, equipment supply or casualty handling in accordance with Incident Command procedures.

BA Main Control

Objectives

To ensure Breathing Apparatus (BA) wearer safety by establishing additional control to co-ordinate BA requirements where there is more than one Stage II Entry Control Point (ECP) or the number of BA wearers is large.

1. Where there is more than one Stage II ECP, or the number of BA wearers is large, an additional control to co-ordinate BA requirements should be established. This control, known as "BA Main Control", should be set up at the most convenient site for easy access and communications with all Stage II ECPs and the Incident Commander (IC).

2. BA Main control is a necessary function in order to provide the Incident Commander with a directly reporting officer whose role is to monitor BA wearers entering the risk area in all sectors of the incident. BA Main control is responsible for BA logistics and to advise the Incident Commander on the number of personnel required to support BA operations. By operating on a separate radio channel to communicate with ECPs BA Main control reduces the number of messages on the command channel. BA Main control's co-ordinating role maintains efficient use of resources, ensures that time records are synchronised and that appropriate call-signs/radio channels are used in all sectors.

3. A control unit, emergency tender, or other suitable vehicle may be used as the Main Control Point (MCP). Examples of BA Main Control Boards (MCBs) if required are shown in Appendix 2.

Nomination of BA Main Control Officers

4. A BA Main Control Officer (MCO) should be appointed by the Incident Commander of the incident.

5. The MCO should have the appropriate command and management skills and have shown proficiency in the responsibility required.

6. MCOs and their assistants should wear black and yellow chequered BA control tabards. MCOs should be identified by means of appropriate words or initials on their tabards.

Monitoring Duties of the MCO

7. The MCO shall:

a. establish and record the availability of BA, associated equipment and personnel at the incident;

b. identify the location of each Stage II ECP, record the name of each ECO and establish communications with Stage II controls and the Incident Commander;

c. take account of any time variations between clocks;

d. establish and record the requirements for relief teams of BA wearers from each of the Stage II ECPs; and

e. request availability of sufficient BA wearers to provide the relief teams required by each Stage II ECP and dispatch them to arrive at the ECP at least 5 minutes before required.

Emergency Provision Duties

8. The MCO shall:

a. after liaison with the ECOs advise the Incident Commander on:

(i) the number of emergency BA teams required; and

(ii) the number in each team.

Note: All members of emergency teams should be fully equipped at least to the standard of BA wearers committed to the incident.

b. in preparing the advice at 8.a above the MCO needs to consider:

(i) the number, size and location of BA teams committed to the incident;

(ii) the complexity of the incident;

(iii) the potential hazards from development of the incident; and

(iv) where possible, the need for one of the emergency teams to be at least of equal number to the largest BA team committed.

Note: As a minimum there should be one emergency team of two BA wearers standing by for every ten BA wearers committed to the risk area.

BA Equipment Duties

9. The MCO shall:

a. obtain sufficient fully charged cylinders and other equipment necessary for preparing BA for re-use, including the collection of equipment from appliances in attendance and arranging for mobilising controls to be warned of likely future requirements (e.g. for cylinder recharging and re-supply);

b. control and account for, cylinder stocks at the incident, including exchange/issues of full for empty cylinders from bulk stocks to users;

c. control the return of all cylinders (full or empty) to the appropriate station / establishment during and at the conclusion of the incident; and

d. maintain records necessary to allow the duties of the MCO to be conducted.

10. Where a BA Main Control is in operation, BA wearers should report to the ECP after leaving the risk area, collect their tallies and if required report to BA Main Control, after any necessary debriefing.

Duties of Breathing Apparatus (BA) Wearers at an Incident

Objectives

To ensure Breathing Apparatus (BA) wearer safety by confirming that all equipment is functioning correctly and by the application of standard control procedures prior to entering, inside, and on withdrawal from the risk area.

1. Firefighters ordered to wear BA at an incident shall:

   a. check that the apparatus is functioning correctly by carrying out the tests referred to in "Pre Entry Tests" page 4-2 paragraph 1 (including checking the tally details for correctness and the ADSU by brief operation);

   b. ensure that no electronic equipment is carried into the risk area e.g. mobile phone, pager.

   c. ensure that information contained in the briefing provided by the team leader is understood before entering the risk area;

   d. hand their tally to the Entry Control Officer (ECO) at the Entry Control Point (ECP) before entering the risk area;

   e. regularly check their pressure gauge whilst in the risk area to;

      (i) monitor air consumption;

      (ii) allow sufficient duration to withdraw to the ECP before the low pressure warning whistle sounds; and

      (iii) update the BA team leader, as appropriate.

   f. maintain regular verbal contact with other members of their BA team;

   g. collect their BA tally from the ECO on final exit from the risk area;

h. on collection of the tally, ensure that any information of use to teams entering the risk area, or the Incident Commander, is made known to the ECO through the team leader; and

i. after collecting their tally, report to the BA Main Control if required (if one is in operation).

2. If a replacement cylinder is fitted and the BA is required for immediate re-use by the original wearer (see "New Entry and Re-entry to an Incident" page 1-24), the pre-entry test should also include those checks referred to in paragraph 1.a above.

3. Personnel required to wear BA must maintain the area of the seal free from hair (facial or head). Failure to do so will impair efficiency of the seal and create an avoidable safety hazard to the BA wearer.

4. Guidance on the wearing procedures and the responsibilities of a BA team leader are set out in "Duties of BA Team Leader" page 2-8 and "Incident Procedures" page 2-15.

Emergency Teams

Objective

To provide prompt emergency assistance to Breathing Apparatus (BA) wearers.

1. Emergency teams of BA wearers must be established at all incidents where Stage II BA entry control procedures are in operation, and at other incidents as soon as personnel resources permit (see "Duties of Stage I ECO" page 1-9).

2. The Entry Control Officer (ECO) is responsible for informing the Incident Commander of the need for an emergency team, (unless this function has been assumed by the BA Main Control or the Main Control Officer). The Incident / Sector Commander shall nominate an emergency team of BA wearers from those available at the incident. The composition of emergency teams will depend upon the nature of the incident, the location of BA wearers and the number of BA wearers in the largest teams. A minimum of two BA wearers will be required for every emergency team and these will be equipped with cylinders (see also "BA Main Control page 1-17) with at least equivalent maximum duration to the BA of the wearers committed to the risk area.

3. The emergency team shall be suitably equipped for the incident in hand. This may include, for example:

   a. radio communications equipment;

   b. resuscitation equipment;

   c. an additional set of BA;

   d. appropriate air line equipment (see page 3-4 "Other Air Lines) ; and

   e. any other specialist equipment provided for this purpose (e.g. thermal imaging camera).

4. The equipment should be tested and ready for immediate use. Where BA wearers at an incident are wearing protective clothing in addition to their BA, the emergency team will be similarly protected.

Deployment of an Emergency Team

5. The following procedures should be applied:

a. the emergency team should rig (but not start-up) in BA and stand by at the ECP until instructed to enter the risk area by the ECO, or until relieved of that duty;

b. prior to entry, the ECO will ensure that all members of the emergency team are fully briefed about the emergency, the likely location of the wearer(s) in distress (if this is known) and will collect the emergency team's tallies and record their actions on the ECB;

c. when available, BA guidelines laid into the risk area should be followed; and

d. following deployment, the ECO (or the MCO) should inform the Incident Commander, and call for a replacement emergency team immediately.

New Entry and Re-Entry to an Incident

Objective

To apply appropriate control measures where re-entry to the risk area is required in circumstances where new entry procedures are either unnecessary or inappropriate

1. A team withdrawing from the risk area, closing down their sets and accepting their tallies may service their sets and change the cylinders (where necessary). If another entry into the risk area is needed this is regarded as a new entry and fresh records are required.

2. If a team temporarily withdraws, e.g. to collect a piece of equipment or pass a message, but do not remove their face masks, close down their sets or collect their tallies they may immediately re-enter the risk area. This may be regarded as part of their initial working duration and no fresh records or amendments to records are required.

3. In exceptional circumstances it may be necessary for BA teams to re-enter a risk area to perform a specific task after they have withdrawn from the original entry, closed down their sets and reported to the ECO. To allow a re-entry the Incident Commander must first be satisfied that:

   a. the re-entry is for a clearly defined specific task;
   b. the cylinder content of all wearers are sufficient for the task; and
   c. there are no doubts about the fitness of any BA wearer for the task to be done.

4. The rule of a minimum of 80% cylinder contents before entry may be ignored in these specific circumstances. The ECO must record fresh details for all team members involved in the re-entry procedure.

5. For all circumstances where a BA team re-enters a risk area the Entry Control Board (ECB) should be appropriately annotated.

6. Unless unavoidable, the Incident Commander should ensure that BA wearers are rested before re-entry to a risk area. This is particularly important if the conditions are difficult or strenuous.

Incidents in other Fire Authority areas

Objective

To ensure inter-operability of Breathing Apparatus (BA) use between Fire Authorities.

1. It may sometimes be necessary for BA to be used in the mobilising areas of other Fire Authorities.

2. Chief Fire Officers of adjacent Fire Authorities should ensure that efficient and effective arrangements are in place to maintain the management and control of breathing apparatus procedures in accordance with this guidance in circumstances where more than one Fire Authority is operating at the same incident.

3. In such circumstances, firefighters from supporting Fire Authorities may wear BA, but with the following additional safeguards:

    a. BA teams will be composed of firefighters using the same type of BA and fitted with cylinders providing the same maximum capacity;

    b. BA wearers should wear only BA of a type identical to that used in their Fire Authority and with which they have been trained;

    c. ECOs and BA wearers must be alert to the fact that Fire Authorities attending may use cylinders that provide different capacities (and hence duration) from those operating at a similar pressure in the wearer's Fire Authority. Each wearer must draw the maximum contents of their cylinder to the attention of the ECO when handing in the tally so that the correct "time of whistle" can be calculated from the appropriate duration table; and

    d. where an ECB does not include a duration table for a particular cylinder capacity and type, the corresponding table on the ECB from the Fire Authority using that type of apparatus should be used to calculate the "time of whistle". Although two or more ECBs may have been used in the calculation of the working duration, the tallies may be placed on a single board (subject to the total number of wearers not exceeding the maximum permitted).

4. The ECO may be drawn from amongst suitably qualified BA wearers of any Fire Authority attending the incident (see "Duties of Stage I ECO" page 1-9, "Duties of Stage II ECO" page 1-15 and "Size, Composition and Conduct of BA teams" page 2-7).

5. BA wearers and ECOs should be aware that Fire Authorities attending a cross-border incident may use ADSUs which produce an emergency signal different from their own.

Guideline Procedures

Objectives

To enable:

A team of Breathing Apparatus (BA) wearers in a risk area to retrace their steps to the Entry Control Point (ECP).

Subsequent teams to readily locate a team of BA wearers.

Subsequent teams to locate the scene of operations.

1. The term "guideline" defines the special line which is used either as a "main guideline" for initial search and to indicate a route between an access point and the scene of operations, or alternatively, as a "branch guideline", where it is necessary to traverse or search deeply off a main guideline. The method of use of the line for either purpose is the same. The term "personal line" defines a special line secured to the BA set of the wearer, and which may be attached to the guideline to enable the wearer to follow the line and in appropriate circumstances search off it up to the limit of the personal line.

2. Guidelines are to be used or discontinued in use only on the instruction of the Incident Commander. The BA guideline should be used where no other practical or appropriate means are available for tracing the way out of a risk area.

Note: BA guidelines must be used when entry is made into areas of high expansion foam.

3. Tactical ventilation can be used to improve visibility and may negate or supplement the use of BA guidelines (see "Notes on when to use BA" page 2-1 and Fire Service Council's, Junior Officer Handbook, page 4-5).

4. It is essential to avoid confusion when using guidelines. They should be always laid in accordance with the following procedures and each firefighter should at all times be aware whether they are attached to either the main guideline or a branch guideline. The exit route on all guidelines is identifiable by touch. Two tabs 150mm apart are fitted at 2.5m intervals along the length of the line. A knotted tab (consisting of two separate knots, overall length 50mm) indicates the exit route and must therefore always be on the "way out" side of the plain tab (unknotted and 125mm long). When a guideline has been laid, the BA team leader must attach to it by use of a personal line.

Application of the procedures

5. The procedures for laying guidelines are as follows:

a. the guideline container is secured to the leader of the team nominated to lay the guideline (or to the team leader's BA set);

b. unless the guideline is to be used to extend an existing guideline or to form a branch guideline, it is to be secured to a suitable object outside the risk area, and to be under the control of the Entry Control Officer (ECO), before the BA team enter the risk area;

c. any main or branch guideline tally required for a BA guideline is to be fitted to the line by the ECO before the team enter the risk area (see "Duties of Stage I ECO" page 1-9" and "Duties of Stage II ECO" page 1-15); and the ECO must check that the first tab to appear from the carrying container has two knots tied into it;

d. the guideline is to be secured at intervals to suitable objects on the route by other members of the guideline team. Tie-off points need not be close together but at sufficient intervals to keep the line off the ground. The line is to be made secure on the side of the search and crossing over from one side to another is to be avoided as far as possible;

e. when it is known, or suspected, that penetration may be deep, an additional guideline should be carried by another member of the team. A guideline can be extended by unclipping the looped end from the container and clipping on the snap hook of another guideline;

f. if an emergency withdrawal is necessary, the team leader should release the guideline container and by following the guideline, the crew will then be able to retrace their steps. If possible, the guideline container should be secured to a suitable object before withdrawal;

g. the same procedure should be adopted when a team laying a guideline has to retire before the objective is reached;

h. when relief teams are used, it is important that they relieve the correct team. ECOs must ensure that teams are correctly instructed as to which main or branch guideline they are to use. The relief crew must ensure they find the correct guideline; and

i. outgoing teams on guidelines should normally take precedence over teams entering the risk area.

Note: A guideline is always stowed in such a way that the running end pays out first.

Guidelines and guideline identification tallies are described in "BA Guidelines" page 4-11.

Main Guidelines

6. The following points should be noted about the use of main guidelines:

a. There should be no more than two main guidelines in use at any ECP;

b. Only one main guideline is to be laid along any single route leading from an access point to the scene of operations. This main guideline may consist of a number of guidelines jointed together as described in paragraph 5(e);

c. Main guidelines leading from an access point are to be designated "A" and/or "B" by the access point and are to be marked by using one of the tallies provided for this purpose (see "BA Guidelines" page 4-11).

Branch Guidelines

7. Branch guidelines should be:

   a. used where the distance of the area of search from the main guideline is greater than the length of one personal line;

   b. limited to four branch guidelines from any ECP;

   c. designated "1", "2", "3" or "4" by the ECO. The lines are marked by using a branch guideline tally (the number of holes representing the number of the branch guideline);

   d. affixed with branch guideline tallies by the ECO before it is taken into the risk area;

   e. attached to the main guideline securely; and

   f. secured to the wearer as for guidelines.

8. For safety reasons and to avoid potential confusion, branch guidelines should not be joined together, or extended.

9. For safety reasons and to avoid potential confusion, branch guidelines should be secured to main guidelines in such a way as to ensure that the branch guideline tally is a minimum of 1 metre from the main guideline.

10. Details of the main and branch guideline to which individual teams are committed must be recorded on the ECB by the ECO.

11. The ECO is responsible for the removal of main and branch guideline tallies when the lines to which they are attached are removed from the risk area. They are not to be removed by any other person or for any other reason.

Personal Lines

12. The personal line allows members of a BA team to attach themselves to each other or to a guideline using the 1.25m length of line and also permits a search to be extended from a main guideline or branch guideline to the full extent of one personal line. The personal line is described in "BA Guidelines", page 4-11.

13. While a guideline is being laid, all members of the team other than the team leader should attach themselves either to the team member in front of them by the short length of personal line or to the guideline using the short length of personal line.

14. After a guideline has been laid the leader of any subsequent following teams must be attached to it by the short length of personal line. The other members of the team must be attached by the short length of personal line to the team member in front of them or to the guideline. (Attachment by team members to the remainder of the team has an advantage when the ground is reasonably level and passing teams may be encountered, only the team leader has to unhook. Individual attachment of the personal line to the guideline is generally more suitable where shafts or steep ladders may be encountered, as it allows more freedom of movement).

15. When attached individually to the guideline, team members should also remain within physical contact distance of the remaining members of the team.

16. When searching off a guideline, only the team leader may deploy a personal line to the limit of its length and in such circumstances other members of the team should remain between the team leader and the main or branch guideline. Where the area to be searched is a greater distance from the guideline than the length of a single personal line will permit, a branch guideline must be used.

Telemetry Procedures - Basic Telemetry

Objective

To provide additional information on the status of BA wearers in the risk area in order to enhance the effectiveness of command and control at incidents.

Notes on Telemetry

1. The telemetry equipment referred to in this procedural guidance is an automatic, electronic breathing apparatus control system which monitors the status of individual BA wearers from outside the risk area. The standard Entry Control Board (ECB) is augmented with a "radio base station", with additional electronic displays, which is required for use with the telemetry equipment. This base station is referred to as an Entry Control Unit (ECU). Radio technology is used to connect "portable units" with "base stations". A "portable unit" is a radio unit attached to the firefighter's BA set which is used to transmit and receive data at pre-set intervals. The equipment provides the following basic functions:

    a. "Portable units" have unique electronic identities so that they can be individually "logged-on" to a base station at an incident. This is achieved by inserting the ID encoded tally key into the Entry Control Unit (ECU);

    b. The transmission of a distress alarm signal from a "portable unit" to any ECU in range;

    c. The transmission of an alarm signal from a "portable unit" to any ECU in range indicating that the user is withdrawing from the incident for reasons of personal safety;

    d. The transmission of an alarm signal from an ECU to all "portable units" logged on to the base station to cause an audible alarm on the "portable units" and initiate an emergency evacuation;

    e. The transmission of an alarm signal from an ECU to a selected "portable unit" to cause an audible alarm and initiate an emergency evacuation of the "portable unit" wearer and any other members of the wearer's team;

f. The ECU features a number of key elements. These include a clock display screen and a group evacuation button. Various types of data from all logged-on "portable units" can be selected on the ECU which can include;

(i) cylinder pressure;
(ii) ambient temperature;
(iii) time of whistle;
(iv) time to whistle;
(v) elapsed time.

g. Signals can be sent, received and acknowledged by BA wearers and the ECO;

h. In the event of radio signal being lost, audible and visual warning to alert both the BA wearer and the ECO;

i. The provision of a downloadable data-base of base station transactions for post incident analysis;

j. The provision for testing Radio Distress Signal Units (RDSUs) without generation of unwanted alarms.

Note: In addition to the basic functions listed above, suppliers may offer other features.

2. The use of telemetry equipment should be viewed as a means to supplement the command and control procedures described in this guidance document.

3. Telemetry "portable units" must be physically combined with the functions of an Automatic Distress Signal Unit (ADSU). Such a combined unit will function as an ADSU if it is decided not to deploy telemetry at an incident or until a telemetry base station is set up. For these devices, the log-on procedure is automatically initiated by removal of the key from the unit. Telemetry is not regarded as being "in use" unless and until one or more telemetry base stations have been deployed at an incident.

4. Telemetry may be used at any incident involving the use of BA and may be introduced even after BA teams have been committed.

5. The procedural guidance in this document is based on the basic functionality of telemetry equipment. Fire Authorities will need to develop their own procedures for dealing with any additional functions of which their equipment is capable, bearing in mind that other Fire Authorities attending incidents might not be equipped with telemetry equipment or even if they are so equipped, that their equipment may provide different functions beyond the basic functions. (see “Incidents in other Fire Authority areas” page 1-25)

6. Where used, telemetry is an additional safety feature. It does not replace any other safety feature or procedure. Like any device which relies on radio transmissions, it is possible for "portable units" to be out of range of the base station either because of the distance from that base station or due to physical conditions at the incident which further inhibit effective radio propagation.

Allocation and Training

7. Fire Authorities intending to introduce telemetry into their procedures must ensure an appropriate "change analysis" has been carried out to their specific BA procedures before implementing the change. This should include consultation with neighbouring Fire Authorities.

8. Individual Fire Authorities will have to make decisions on the allocation and availability of telemetry equipment and the circumstances in which it should be used. Whilst it is envisaged that the use of telemetry may, in time, become widespread, it may be sufficient for one member of each BA team deployed to be equipped as a "portable unit" rather than for the allocation to extend to every member of the team. It is also possible, and permissible, that some teams deployed at an incident might be equipped as "portable units" and others not. These considerations should be included in the risk assessment of the allocation of telemetry equipment and should be carried out prior to its introduction.

9. Where telemetry is used, fire-fighters must have appropriate practical training in the various telemetry functions and be aware of the implications for the command and control procedures. Training must cover all the procedures that are necessary for the basic telemetry functions.

10. The ECO can be assisted, if resources permit, by an Entry Control Unit (ECU) operator who should be a fully qualified BA wearer. The ECO and the ECU operator must be competent in the underpinning knowledge and skills necessary to safely use the equipment. ECOs and ECU operators also need to have basic understanding of how radio signals are propagated so that they can place the ECU in the optimal position for maximising the effective range of telemetry.

11. The procedures to be followed in the event of a loss of contact or breakdown in telemetry communications should take into account the existence of other means of communications with BA teams, i.e. by radio, or by direct speech.

12. "Portable units" and ECUs have a unique electronic identity which includes a Fire Authority identifier. This identity will be used in all ECU transaction displays and records. In order to reconcile displays on the ECU with BA wearers it is necessary to provide a durable means of associating the "portable unit" with the BA tally of the apparatus with which it is used. This could be achieved by including the "portable unit's" ID on the BA tally.

Operational Deployment

13. The decision whether or not to deploy telemetry at an incident should be taken by the Incident Commander as part of the dynamic risk assessment.

14. For incidents where "Stage I" entry control procedures are in use, the ECO may also be the ECU operator. Where "Stage II" entry control procedures and/or multiple ECUs are in use or the incident involves large numbers of BA wearers, consideration should be given to separating the functions and responsibilities of the ECOs and the ECU operators as soon as human resources permit.

15. Where multiple ECUs are in use at an incident, all ECU operators should be in contact with each other, either by radio or other effective means through BA Main Control.

16. Fire Authority procedures should ensure that the clocks of ECUs are correct. Fire Authority procedures should also take account of how to deal with discrepancies between the times of clocks on multiple ECUs in use at an incident and between ECUs and ECBs. It is not recommended that clocks would be adjusted at an incident.

Emergency Evacuation Procedures

17. The audible evacuation signal produced by a telemetry "portable unit" should be treated the same as all other evacuation signals by all personnel within audible range.

18. Where two or more ECUs are in use at the same incident, and a full emergency evacuation is required; each ECO at the scene will need to initiate the emergency evacuation signal.

19. After transmitting an emergency evacuation signal, an ECO will automatically confirm that all "portable units" have received and acknowledged the signal. In the event that one or more "portable units" do not acknowledge receipt of the signal, the emergency evacuation signal should be repeated (such repeats will not affect "portable units" that have already acknowledged the emergency evacuation signal).

Selective Emergency Evacuation

20. Selective Emergency Evacuation is an emergency procedure and is not to be used for any other purpose.

21. Selective Emergency Evacuation is an additional emergency feature available when telemetry is employed. It allows the Incident Commander to evacuate specific BA teams in an emergency whilst leaving other BA teams in place. For example, to ensure that an escape route remains protected whilst the evacuation takes place, or to evacuate a team or teams from an unacceptably hazardous area.

22. The audible signal for Selective Emergency Evacuation is distinct and different from that of the Emergency Evacuation Signal. It is specific and applies only to the members of the BA team to whom it is addressed, and by whom it is received.

23. The Incident Commander is responsible for deciding to implement Selective Emergency Evacuation and for deciding which teams should be evacuated by this method.

Wearer Withdrawing for Reasons of Personal Safety

24. Telemetry allows the user of a "portable unit" in an emergency to signal an intention to withdraw from the risk area because the incident conditions in the vicinity of the team of which the user is a member are such that they present an imminent and unacceptable risk to the safety or health of one or more members of the team.

25. Wearer withdrawing for reasons of personal safety is an emergency procedure. It is not a substitute or a replacement for the Distress Signal on an ADSU.

26. The decision on whether or not to signal that the user is withdrawing for reasons of personal safety is that of the user. However, users (where they are not themselves the BA team leader) should, where practicable and provided that this does not significantly increase the hazard, first convey their intention to the BA team leader.

27. On receipt of a User Withdrawing for Reasons of Personal Safety signal, the ECO should accept the signal but should only manually acknowledge it if it originates from a "portable unit" logged-on to the ECU for which the ECO is responsible. If multiple ECUs are in use at an incident and the signal originates from a "portable unit" which is not logged-on to the ECU for which the ECO is responsible, the ECO should immediately check with each of the other ECOs to confirm whether or not the signal has been received by them. This should occur whether the signal originates from a logged-on "portable unit" on another ECU, or whether the signal originates from a "portable unit" at the incident which at the time is not logged-on to any ECU. If the signal does originate from a portable unit deployed at the incident, but not logged on to any ECU, then one ECU operator nominated by the Incident Commander must manually acknowledge the signal by first manually logging-on the portable unit.

28. ECU operators should inform the Incident Commander of the receipt of reports that one or more BA teams are withdrawing for reasons of personal safety. This information will effect any risk assessment decision that the Incident Commander might make on the deployment of personnel and BA teams and the need to consider either a selective emergency evacuation or an incident-wide emergency evacuation.

Distress Alarm

29. In the event of distress to a BA wearer using a "portable unit" it will behave in a similar manner to an ADSU and (automatically or manually) enter the distress mode and emit the audible distress alarm. Additionally, the "portable unit" will transmit an alarm message which will be received by all ECUs in radio range.

30. In a team comprising of wearers in which two or more have "portable units" only the wearer(s) in distress should normally activate the alarm, allowing the ECU operator to know how many wearers are in need of assistance. (Note: Where the user in distress does not have a "portable unit" a member of the team with a "portable unit" should initiate the alarm message).

31. On receipt of a distress alarm, the ECO should accept the alarm by acknowledging it manually.

32. Emergency procedures are outlined on "Duties of Stage I ECO" page 1-9 and "Duties of Stage II ECO" page 1-15.

Communications Failures

33. The most likely reason for a telemetry communications failure is because a "portable unit" is temporarily out of range of the ECU. To minimise the likelihood of this, distress signals and wearer withdrawing for reasons of personal safety signals are received by any ECU in range.

34. For basic telemetry, there are no indications during use to the ECU operator or the user that communications have been lost. However, if it does become clear that telemetry has failed (other than temporarily due to range), the procedures to be followed are as indicated in "Radio Communications using BA" page 4-16 with due regard being taken of the additional safety function of telemetry and whether or not any other forms of communications with BA teams are still functioning.

35. "Portable units" carry out an internal self-check of some elements of their transmitter before attempting to log-on. In the event that this test indicates a communications fault, the "portable unit will visually indicate this to the user. Where this self-check indicates a communications fault (alone) the "portable unit" can continue to function as an ADSU. Local procedures should determine whether it should be used at an incident as an ADSU or whether it should be regarded as defective and not used.

36. "Portable units" that fail to log-on correctly should not be used.

Additional Duties of the Incident Commander in relation to basic telemetry

37. These duties are additional to those described in "Duties of Incident Commander" page 2-4:

a. To decide based on the risk assessment and the availability of equipment whether or not to deploy telemetry, the number and location of ECUs and to nominate ECU operators if required and available;

b. To decide whether or not selective evacuation is appropriate and to decide which BA teams should be selectively evacuated;

c. To ensure that a decision to conduct an emergency evacuation of all personnel at an incident is conveyed to all ECOs;

d. To ensure that appropriate action is taken to deal with receipts of distress alarm signals that do not originate from the incident.

Additional duties of BA team leaders in relation to basic telemetry

38. These duties are additional to those described in "Duties of BA Team Leader " page 2-8:

a. Deciding on whether or not to withdraw the team in an emergency for reasons of personal safety, and ensuring that the appropriate telemetry message is transmitted and acknowledged;

b. Withdrawing the complete team in the event that an emergency selective evacuation signal is received by any member of the team.

Additional duties of ECOs in relation to basic telemetry

39. These duties is additional to those described in "Duties of Stage I ECO" page 1-9 and "Duties of Stage II ECO" page 1-15 and "At the Fire Station" page 2-13:

a. To set up and operate the ECU in a position nominated by the Incident Commander;

b. To instruct the ECU operator (if provided) who will log-on the "portable units" of BA wearers whose entry records the ECO controls;

c. Receiving and acknowledging distress alarm messages from logged-on "portable units", to include ensuring that the emergency procedures in "Duties of Stage I ECO" page 1-9 and "Duties of Stage II ECO" page 1-15 take place. In the event that the message is received from an unknown "portable unit" to initiate a liaison with other ECOs (if any) at the incident to identify the origin and informing the Incident Commander accordingly. If necessary advising the Incident Commander that the "portable unit" is not in use at the incident;

d. Initiating a selective emergency evacuation or an incident-wide emergency evacuation on the instructions of the Incident Commander, repeating this as necessary where receipt is not acknowledged and informing the Incident Commander if, after repetition, any "portable units" which remain unacknowledged (and still in the risk area according to BA entry records);

e. Logging-off "portable units" after BA team members have collected their tallies.

f. Accepting the log-on attempts of "portable units" for which the ECO is responsible and cancelling those for which the ECO is not (this includes "requesting log-on in the event that BA teams are deployed in advance of telemetry").

Duties of ECU operators in relation to basic telemetry

40. The duties of an ECU operator are:

a. To carry out the instructions of the ECO controlling the entry details of personnel for whom the ECU operator is responsible to include any of the duties listed in paragraph 40 above.

Telemetry Procedures - Contact Signals

Objective

To provide additional information on the status of BA wearers in the risk area in order to enhance the effectiveness of command and control at incidents.

Notes on Telemetry - Contact Signals

1. One additional function offered by suppliers causes each "portable unit" to automatically and periodically transmit a data message to the ECU on which it is logged-on. The ECU is programmed to receive and acknowledge these messages and automatically update the time displayed for that "portable unit" entry. The frequency of these updates is usually set by the supplier at 20 seconds.

2. The ECU is also programmed to detect when it has not received contact signals from a "portable unit" within a programmed period and to indicate this to the ECU operator. Such indications are automatically cancelled in the event that contact is subsequently established.

3. Where the ECU display indicates no-contact, it is open to the ECO to initiate a "requests data" message instead of waiting for the next programmed transmission from the "portable unit" involved.

Operational Deployment

4. The additional feature and the associated programmed transmission periods and no-contact alarm periods will be programmed into equipment when it is supplied to the user.

5. Users will not be able to make decisions whether to deploy this additional feature.

No-Contact display at ECU

6. The most likely reason for a no-contact indication is because the "portable unit" is temporarily out of range of an ECU. However, if it does become clear that telemetry has failed (other than temporarily due to range), the procedures to be followed are as indicated in "Radio Communications using BA" page 4-14 with due regard being taken of the additional safety function of telemetry and whether any other forms of communications with BA teams are still functioning.

Additional Duty of the Incident Commander in relation to telemetry with contact signals

7. This duty is additional to those described in "Basic Telemetry" page 1-39:

   a. To ensure that appropriate action is taken in the event of being advised that contact has been lost with a "portable unit".

Additional duties of ECO in relation to telemetry with contact signals

8. These duties are additional to those described in "Basic Telemetry" page 1-40:

   a. To bring to the attention of the Incident Commander any instance of "no-contact" with a "portable unit";

   b. To attempt to contact the "portable unit" by using the "request data" function.

Telemetry Procedures - Cylinder Contents

Objective

To provide additional information on the status of BA wearers in the risk area in order to enhance the effectiveness of command and control at incidents.

Notes on Telemetry - Cylinder Contents

1. An additional function provided by suppliers involves the connection of additional equipment to the "portable unit" and the breathing apparatus so that dynamic data relating to the BA cylinder pressure are stored and transmitted automatically and periodically to the ECU on which it is logged-on.

2. The ECU is programmed to receive this data and update the display for the "portable unit" so that the remaining cylinder pressure when the last data transfer took place is shown. The frequency of these updates is usually set by the supplier at 20 seconds.

3. The ECU may obtain the current cylinder pressure by initiating a "request data" message instead of waiting for the next programmed transmission from the "portable unit" involved.

Operational Deployment

4. This additional feature and the associated programmed transmission periods and no-contact alarm periods will be programmed into the equipment when it is supplied to the user. Additional hardware and connectors and modifications to the BA set will be required to connect to the apparatus and to provide an electronic connection to the "portable unit".

5. Users will not be able to decide whether to use it in relation to any or all deployments of telemetry.

Additional Duty of the Incident Commander in relation to telemetry with cylinder contents indication

6. This duty is additional to those described in "Basic Telemetry" page 1-39 and "Telemetry Contact Signals page 1-43:

   a. To ensure that appropriate action is taken in the event of being advised that the cylinder pressure of any BA wearer who is still in the risk area is less than 50 bar.

Additional Duties of ECOs in relation to telemetry with cylinder contents indication

7. These duties are additional to those described in "Basic Telemetry" page 1-40 and "Telemetry Contact Signals" page 1-43:

   a. To monitor the displayed cylinder pressure of all "portable units" logged-on to the ECU;

   b. To bring to the attention of the Incident Commander any instance of where the displayed cylinder contents are less than 50 bar.

   c. To commit an emergency team in accordance with "Basic Telemetry" page 1-38, if available, on the basis of a risk assessment by the Incident Commander using data provided by the cylinder contents feature of telemetry.

Section 2: Command Procedures

Introduction

Objective

To manage a safe and successful conclusion to an emergency incident.

Notes on Command Procedures

1. To bring any emergency incident to a successful conclusion effective command procedures are pre-requisite. This is nowhere more apparent than at incidents involving the use of breathing apparatus (BA), where standard procedures are essential throughout the incident at all levels of command. BA wearers must be fully supported by appropriate resources and they themselves must follow the standard procedures and the instructions of the Incident Commander if risks to their health and safety are to be minimised. The Incident Commander, Sector Commanders and the intermediate control officers should all concentrate effort and resources to maintaining a high degree of management over the BA operations and should ensure that the procedures adopted comply with this guidance.

Notes on when to use BA

2. There is a danger of permanent damage to health if BA fails to be worn in an irrespirable or toxic atmosphere. At any incident the Incident Commander is responsible for ensuring that BA is worn whenever it is determined that its use will facilitate operational activities. BA should be worn whenever discomfort and possible injury to a firefighter's respiratory system can be avoided (such circumstances may include car fires, skip fires, "damping down" or "turning over" after a fire). The practice of firefighters rigging in safe air but not putting on their face masks until they reach smoky atmospheres and then starting up their sets is extremely dangerous and must not be permitted.

3. Particular care should be taken when a bridgehead is used (see "Bridgeheads page 1-4). Only in the most exceptional circumstances should a firefighter who has already inhaled smoke, oxygen deficient or toxic fumes subsequently rig in BA; once smoke or toxic fumes are present in the lungs it takes appreciable time for them to be completely cleared.

4. BA or air line equipment should only be deployed on the instruction of the Incident Commander at an incident. BA or air line equipment must always be worn with an Automatic Distress Signal Unit, a lamp and with a personal line, securely fastened to the apparatus. (Gas-tight and chemical protection suits should be provided with a facility for attaching personal line and ADSU.)

5. Where dual cylinder configurations are used for extended working, the following are examples of some additional safety measures that may need to be considered:

   a. Stage II procedures should be implemented where extended working in BA is required;

   b. Extended working should be implemented at incidents where planning has identified a need;

   c. Environmental conditions and the physiological burden being placed on the wearers whilst wearing Breathing Apparatus (BA) for extended working should be considered;

   d. Where dual cylinder configurations are used; "light-weight" cylinders are recommended; this will reduce the physiological stress on wearers;

   e. Only trained wearers of dual cylinder configurations should operate extended working;

   f. Further operational procedures may need to be developed in addition to those contained in this manual e.g. entry checks on cylinder valves;

   g. Regular training should be given on all additional procedures adopted for extended working.

6. When firefighters are hampered in reaching a fire because the route they have to follow is smoke-logged the Incident Commander may decide to employ tactical ventilation (see Fire Service Council's, Junior Officer Handbook, page 4-5). The objective of its use should be identified before commencing operations and the technique to be adopted will vary, depending on what is expected. Ventilation will improve visibility and may negate or supplement the use of BA guidelines. Where there has been a build up of hot gases and conditions for firefighters are very arduous, ventilation can also produce a more tolerable environment and increase a firefighter's working duration whilst wearing BA. Further information is given in the UK Fire Service Manual - Volume 2, Fire Service Operations "Compartment Fires and Tactical Ventilation".

7. Prior to commencing tactical ventilation the Incident Commander should carry out a risk assessment, have appropriate safety measures in place and be aware of the location of all personnel within the risk area.

Duties of the Incident Commander (IC)

1. The Incident Commander (IC) will need to conduct an assessment of the developing and potential risk of the incident before committing Breathing Apparatus (BA) crews. The main duties are explained below. There are various specific references to the IC's duties in this manual. All of the duties are applicable to a Sector Commander or other officer to whom command of BA operations has been delegated or where BA wearers are operating under the officer's command in the relevant sector.

General Considerations

2. The IC, depending upon the urgency and the developments of the situation faced may need to make such assessments in stages (for example, where urgent rescues are required these must take priority). However, at all times the need for life safety must be considered uppermost. The IC should carry out all stages of the risk assessment process as soon as is practical (see National Incident Command System). The risk assessment process should be continuous throughout the incident to enable the IC to review plans in line with any developing risk. Where practicable, and available, the risk assessment process should be aided by information from Pre-incident Planning and Fire Prevention knowledge or intelligence (see Fire Service Council's, Junior Officer Handbook, page 5-5).

Hazard Identification

3. Some hazards will be relatively easy to identify, such as heat and smoke. Other hazards will require further investigation. The IC must consider:

   a. the nature of the incident;

   b. the material involved (or likely to become involved);

   c. the nature of the construction of the building; and

   d. the importance of the building (or risk area) relative to the hazards to the lives of those entering.

Risk Analysis

4. The urgent nature of some situations may require decisions about firefighter deployment and tactics to be made immediately. However, where reasonable and practicable, the Incident Commander should take the following into account when reaching a decision about tactics to be deployed:

   a. the need for rescues to be undertaken, and the likely number of people requiring rescue or removing from the risk area;

   b. the resources immediately available and how quickly other support might be obtained;

   c. the nature and extent of hazards;

   d. the stability of the incident;

   e. the location, number and suitability of the access points;

   f. the risk to the public and adjacent properties;

   g. the information available from people at the scene; and

   h. the means of access to the risk area.

Risk Assessment

5. When reaching decisions on control of risk the Incident Commander should consider:

   a. whether BA is required to deal with the incident and the appropriate level of BA control;

   b. the adoption of any other appropriate safety precautions required to be implemented in conjunction with the use of BA for a specific risk (e.g. chemical protective clothing);

   c. the siting and number of Entry Control Points (ECPs);

d. deployment of BA teams, emergency and relief teams, and the need to ensure they are as well briefed as possible on the task and the possible risks involved;

e. the use of BA guidelines;

f. the need for BA communications;

g. the implementation of the special procedures for BA wearer distress (see "Incident Procedures" page 2-15);

h. the experience of BA crews available; and

i. the sufficiency of BA and associated equipment available to deal with the incident and the need to request any additional assistance required.

6. Any of the duties of paragraph 5 above, with the exception of 5.a, may be delegated.

7. The responsibility of ECOs extends only to the control and management of the ECP to the extent outlined in this guidance. The Incident Commander, depending upon the likely extent of activity of BA wearers, should appoint officers to assist with the management of firefighting and rescue activity at each ECP, taking account of the sectorisation of the incident ground.

8. The Safety, Health and Welfare at Work (General Applications) Regulations, 1993 require that all accidents at work causing death or injury and dangerous occurrences including the failure of Breathing Apparatus must be reported on approved forms to the Health and Safety Authority. Where the Incident Commander determines that an incident should be treated as one which requires investigation, the procedures set out in the Fire Authority's Safety Statement should be followed.

Size, Composition and Conduct of Breathing Apparatus (BA) teams

Objective

To provide an appropriate response to operational incidents.

Notes on BA teams

1. The Incident Commander will need to consider carefully the size and composition of BA teams and must ensure that the team leader(s) is fully briefed on what is required of the team. Effective leadership is required and the Incident Commander should ensure, so far as is practical, that the team is led by an experienced BA wearer. For more complex, difficult or dangerous incidents, team leaders should be drawn from experienced officers whenever these are available. Where possible, BA teams should be formed from crews from the same station and led by their own personnel.

2. The Incident Commander should increase the size of the team in relation to the range and demands of the tasks to be carried out (see Fire Service Council's, Junior Officer Handbook, page 4-5). The more difficult or complex tasks will sometimes benefit from larger teams but too many BA wearers in a team can make communication between team members difficult, can cause delays at the ECP and can generally slow down operations. The size of a team should reflect the BA wearers' experience and competence in anticipated tasks.

3. Teams of from two to four wearers will usually provide optimum effectiveness. In normal circumstances to provide greater flexibility and to reduce the leadership span of control the deployment of a team with two wearers and a second team with three wearers is considered preferable to the deployment of a team with five wearers.

4. In normal circumstances, BA wearers who enter the incident as a team should remain as part of the team for the whole time that they are in the risk area. Teams should only divide in exceptional circumstances for specific tasks, with the prior instruction of the team leader. Where practicable, the ECP should be informed of the decision to divide a team. A new team leader must be appointed for the newly seperated team. In reaching a decision about whether to separate, consideration should be given to the estimated time of whistle of all personnel, the nature of the tasks, the location of the tasks, the complexity of the route(s) to the exit point and the location and ease of access of emergency team(s) if available.

5. The cages of aerial appliances must not be used as a site for a BA ECP. Where it is necessary for BA wearers to enter a building or structure at or above ground level by use of ladders an ECP should be established at ground level adjacent to the ladder.

Duties of the Breathing Apparatus (BA) Team Leader

1. A member of the BA team should be designated as team leader and, where possible, should be an experienced BA wearer.

2. The duties of the BA team leader are to:

   a. ensure the team is fully briefed before entry into the risk area;

   b. co-ordinate gauge checks and ensure that the team return to the Entry Control Point (ECP) before any low pressure warning whistle activates, or if appropriate, within limits previously agreed with the Incident Commander to prevent undue exposure to difficult or strenuous conditions;

   c. monitor the working conditions and be aware of potential physiological effects that may have a negative effect on team members and working duration;

   d. update the ECO if communications equipment is being used; and

   e. inform the ECO, as soon as is practical, of any development of the operational incident that is likely to be considered significant by the Incident Commander.

3. The BA team leader is responsible for the conduct of the team during the time that it is within the risk area. The team leader will base decisions for action on:

   a. the training and experience gained from previous incidents;

   b. information received by communications from outside the risk area;

   c. sensory perception inside the risk area (e.g. noise, temperature);

   d. information from BA and associated equipment (e.g. gauges, whistles, thermal imaging cameras); and

   e. other team members.

4. A BA team leader's duties also extend to decisions about when to withdraw from the risk area, (Advice is given in "Withdrawal of BA teams" page 2-10) and responding to ADSUs (See "Emergency Procedures" page 2-18).

5. BA wearers are often at the forefront of firefighting activity. BA team leaders and BA team members should therefore be alert to the potential for flashover and/or backdraught. Advice on recognising the symptoms associated with these phenomena and firefighting tactics to employ is given in UK Fire Service Manual, Volume 2, Compartment Fires and Tactical Ventilation.

6. The duties and factors influencing decisions taken when leading an emergency team are similar to those prescribed above (see also "Emergency Teams" page 1-22 and "Emergency Procedures" page 2-18).

Withdrawal of Breathing Apparatus (BA) Teams

Objective

To ensure the safe and co-ordinated withdrawal of BA teams from the risk area.

Notes on Withdrawal

1. The decision about when to withdraw from a risk area is a very important one. The central aim must be to ensure that all of the BA team members return to the Entry Control Point (ECP) by the estimated time of operation of the low pressure warning whistle, subject to circumstances which develop from the time of entry which necessitate an early withdrawal. However, the timing of withdrawal from a risk area must take into account:

    a. unusual physiological or psychological stress or discomfort experienced from rapid temperature increase;
    b. the depth of penetration into the risk area when using BA guidelines;
    c. a deteriorating situation.

Application of Withdrawal Procedures

2. The Incident Commander, ECOs and BA team leaders duties extend to ensuring that BA wearers must not be exposed to an inappropriate level of risk. BA wearers are also responsible for ensuring that team leaders are made aware of any relevant developments that might lead to the need for an early withdrawal from the risk area.

3. BA team leaders must not rely solely on cylinder contents when reaching a decision about when to withdraw their team but should take into account information received from all sources. BA team leaders must withdraw their team, if any member:

    a. has an uncontrolled loss of pressure;

    b. appears to be unwell, confused or in discomfort (especially when exposed to rapid temperature increase);

    c. has a gauge which has become faulty or unreadable;

d. has been exposed to an irrespirable atmosphere due to a BA failure; or

e. has a low pressure warning whistle activating.

4. Team withdrawal should occur when:

a. the team leader, acting on personal initiative, experience, assessment or on the advice of team members, decides that conditions in the risk area have deteriorated to the extent that BA team members are exposed to an inappropriate level of risk;

b. a team member reaches a pre-determined pressure gauge reading set by the Incident Commander following an assessment of the physiological risk and other relevant information;

c. the emergency evacuation signal sounds (e.g. an ACME Thunderer whistle).

5. In normal circumstances a team should not divide following entry to the risk area. Therefore Incident Commanders should be aware that two teams each of two members is generally considered preferable to a single team with four members. The two teams provide greater flexibility in relation to withdrawal from the risk area. (See "Size, Composition and Conduct of Breathing Apparatus Teams" page 2.7).

6. The Incident Commander should immediately be advised of any decision to withdraw prematurely from a risk area.

General Duties and Procedures

Objective

To ensure competent and safe Breathing Apparatus (BA) operations.

Notes on General Duties and Procedures

1. Proficiency and safety go hand in hand and never more so than when BA is in use. To ensure proficient and safe BA operations a number of standard procedures have been adopted in this text. These provide for all BA wearers to carry out their duties in accordance with national practice, and ensure that actions and reactions will be common, effective, and speedily and safely carried out whenever firefighters are working together whilst wearing BA.

2. Standard procedures commence at the fire station and continue throughout the incident.

At the Fire Station

Duties of the Officer-in-Charge (OIC)

1. The Officer-in-Charge (OIC) of the duty watch or retained station crew should:

   a. nominate wearers and Entry Control Officers (ECOs) for each appliance equipped with a BA Entry Control Board (ECB). In nominating BA wearers and ECOs the OIC should take into account any other specific duties any crew member may have at an operational incident;

   b. ensure that all the appropriate tests of equipment required to be carried out by station personnel are effected, and that the test and other records are accurately maintained;

   c. ensure that defective equipment is removed and that replacement equipment is obtained as soon as possible;

   d. ensure that BA and associated equipment is maintained in a clean, safe and serviceable condition and is available for operational use;

   e. ensure that the recommended continuation training in the wearing, use and the control of BA and associated equipment is maintained for the personnel for whom the OIC is responsible; and

   f. ensure that personnel are aware of their obligation to inform the OIC of any perceived deficiencies in the use of BA which should influence continuation training requirements.

2. Personnel who are nominated as Stage I ECOs or Stage II ECOs (or to assist Stage II ECOs) must be qualified BA wearers. Throughout a tour of duty an OIC will make such changes as are necessary in the nomination of BA wearers and ECOs. OICs at retained stations will nominate BA wearers and ECOs as soon as the crew members and numbers are known.

Duties of BA wearers on nomination

3. A crew member nominated to wear BA will:

   a. carry out the appropriate test for the apparatus (see "General Check" page 4-3) and replace the cylinder on the apparatus with a fully charged cylinder if, when tested, the pressure gauge indicates contents less than 85% of full capacity;

   b. as soon as is practicable after completing the test described in "General Check" page 4-3 record the test in the test record maintained for the apparatus (the wearer should note that in the event of their being unable to record the test, they must indicate verbally to the OIC that the set has been checked and is working satisfactorily); and

   c. report any defects in the apparatus to the OIC.

Duties of ECOs on nomination

4. An individual who is nominated as ECO will, as soon as practicable:

   a. Examine the ECB (see "BA Entry Control Boards" page 4-8 and " "Rapid Deployment Procedures" page 1-6);

   b. Examine the BA tabard;

   c. Ensure the availability of BA ancillary equipment such as guidelines, guideline tallies, thermal imaging camera, evacuation whistle etc. ;

   d. Synchronise the ECB clock with Control; and

   e. Report to the OIC any defects or omissions.

Incident Procedures

1. In addition to the general command and control procedures set out in this manual, there are a number of particular points to note in relation to health and safety at an incident (see "General Duties and Procedures" page 2-12).

Breathing Apparatus (BA) Wearer Procedures

2. In addition to the duties set out in "Duties of BA wearers at an Incident" page 1-20, BA wearers should:

   a. don and start up their BA in safe air, and check the set and facemask for security of fit and that the main valve is fully opened;

   b. check lamps and firefighting equipment by operation immediately before entering the risk area and at intervals appropriate to the incident;

   c. check communications equipment immediately before entering the risk area and at regular intervals whilst in use;

   d. check the pressure gauge before entry and agree the reading shown on the tally with the Entry Control Officer (ECO) (unless "Rapid Deployment" procedures are in use) page 1-6;

   e. monitor the pressure gauge at regular intervals throughout the time in the risk area (in addition, BA team leaders should check the gauges of all team members at regular intervals);

   f. as far as is reasonably practicable, comply with the instructions given by the Incident Commander and the ECO and follow any instructions given by the team leader;

   g. withdraw from the risk area on the instructions of the BA team leader (see " Withdrawal of BA Teams" page 2-10); and

   h. collect entry control tallies from the ECO as the wearer exits from the risk area.

Note: Wearers should not present themselves to the ECO if the pressure gauge indicates contents less than 80% of full capacity (other than for re-entry for a specific task).

Duration Tables

3. The following points about duration tables should be noted:

a. Duration tables (Appendix 1) are provided as a guide to the average amount of air likely to be used by a firefighter at a standard incident. They serve as an indication, which has proved to be effective over many years, of the time that BA wearers can rely on the content of their cylinders to sustain life;

b. Particularly difficult and strenuous operations (e.g. great heat or difficult access) are likely to result in reduced working times being available for the wearers (see "Duties of Stage I ECO" page 1-9);

c. A number of definitions are used in relation to the duration of BA:

(i) Full Duration:
The period during which BA is expected to provide respiratory protection from the moment the cylinder valve is opened until the cylinder content is exhausted.

(ii) Working Duration:
The period during which BA is expected to provide respiratory protection from the moment the cylinder valve is opened until the moment at which the low pressure warning whistle starts to operate.

(iii) Safety Margin:
The period during which the low pressure warning whistle operates (see "Emergency Procedures" page 2-18).

d. Brigades use various types and sizes of cylinders in conjunction with BA equipment. Some of these are of similar appearance. Often different sizes of cylinder will operate at identical pressures. These produce different air capacities with correspondingly different working durations for BA wearers. ECOs must give particular attention to this and ensure that the correct duration tables are used.

Low Pressure Warning Whistle

4. The low pressure warning whistle is designed to operate when the remaining cylinder contents provide only the safety margin.

5. If the procedures set out in this manual are correctly applied a BA team should have withdrawn from the risk area in advance of a low pressure warning whistle being activated.

6. In the event of a low warning whistle operating in the risk area, the wearer of the set involved must immediately inform the BA team leader who must immediately withdraw the BA team.

Note: The duration of BA is severely limited after the whistle starts to sound.

Hydraulic Platforms and Turntable Ladders (Aerial Appliances)

7. It is undesirable for aerial appliances to be operated by BA wearers (either from the cage or from ground level). Where, in exceptional circumstances, it is necessary to operate the aerial appliance whilst wearing BA it should be borne in mind that the facemask visor can distort vision.

8. The cage of an aerial appliance is not to be used as the site of an Entry Control Point (ECP).

Emergency Procedures

Objective

To provide procedures to respond effectively and promptly to potential life threatening situations.

Notes on Emergency Procedures

1. Advice on the provision of emergency teams is given in "Emergency Teams" page 1-22.

Guidance for BA wearers

2. BA wearers should indicate that they are in distress by operating the Automatic Distress Signal Unit (ADSU). Such action should be taken if there is risk to life or of severe injury to any BA wearers in the team, or if the team feels it cannot evacuate safely from the incident by their own unaided efforts, or if they are unable to trace their route to their exit point. In the unlikely event of a distress signal warning device failing to operate, the warning device of another team member should be operated.

3. When a distress signal is heard the team leaders of BA teams who have sufficient reserves of air are to direct their teams to investigate the source of the sound. Rendering assistance to the wearer in distress is to take precedence over the work in hand but regard must be given to keeping escape routes open and for rescues already being carried out. Once sufficient help is available any hose lines temporarily abandoned must be reinstated.

4. A number of devices exist which produce a similar sound to that of an ADSU. Many of these devices, such as freezer alarms and single point smoke detectors may be encountered at an incident. Such a sound must be investigated to ensure that it is not a distress signal.

Summoning Assistance

5. If BA radio communications are not in use, BA wearers may gain the attention of other team members or other BA teams by loud, slow and regular hand clapping. (Loud, slow and regular clapping is not a distress signal).

Entrapped Procedure

6. The aim of the entrapped procedure is to allow a BA wearer to maximise the duration of BA in the event of becoming trapped and being unable to withdraw from the risk area.

7. No provision exists for conserving the air supply in open circuit BA other than by the wearer moderating demand for air by using the least possible energy.

8. When a wearer of compressed air BA becomes aware that it is not possible to escape the risk area, the following action should be taken:

   a. Operate the ADSU;

   b. Relax as much as is possible in the circumstances by assuming a reclining or seated posture; and

   c. Breathe calmly and gently.

Note: Any supplementary supply function should not be operated. The cylinder valve should not be adjusted, other than to check that it is fully open.

9. The low cylinder pressure warning whistle will operate when the cylinder pressure has fallen to a point where only the Safety Margin remains. (The air consumed by the operation of the low cylinder pressure warning whistle is minimal.)

10. Wearers of closed circuit apparatus should follow any entrapped procedure recommended by the manufacturer.

Confined Spaces

Notes on Confined Spaces

1. Legislative requirements in relation to safe working in confined spaces is contained in "Safety, Health and Welfare at Work (Confined Spaces) Regulations, 2001 (S.I. No.218 of 2001)."

2. Advice on operational procedures for safe working in confined spaces is included in the Fire Service Ancillary Safety Statement, which should be read in conjunction with this guidance. In addition the Ancillary Safety Statement includes generic risk assessments in the following related areas:

   a. Rescues from sewers;
   b. Rescues from silos;
   c. Collapsed structures; and
   d. Aircraft incidents.

3. It should be noted that EN 137 requires that Breathing Apparatus (BA) shall be designed so that the wearer can remove it and, while still wearing the facepiece, continue to breathe from the apparatus. Where necessary the manufacturer's advice should be sought in relation to this procedure.

4. Additional information is contained in the Fire Service Councils, Junior Officer Handbook:

   a. Sewers, page 4-50.
   b. Silos, page 4-51.
   c. Collapsed trench or excavation, page 4-55.

5. The Incident Commander's Dynamic Risk Assessment should include:

   a. the need for a rescue to be undertaken, its urgency and the number of casualties;

   b. the resources immediately available and how quickly support may be obtained;

   c. the nature and extent of the hazards and risks associated with the proposed plan of action; and
   d. the experience, knowledge and training of the breathing apparatus crews available.

6. The use of harnesses and ropes should be considered for personnel operating in confined spaces and other similar locations where vertical access is involved. Harnesses should be compatible with Breathing Apparatus in use and manufacturers' instructions should be obtained and adopted.

7. When a safety line and harness is used:

   a. the free end must be secured to an immovable object outside the confined space;

   b. the harness and line must be adjusted and worn so that the wearer can be safely drawn through any manhole or opening;

   c. the line must be under the control of a competent person for the full duration of the incident; and

   d. each safety line should be identified e.g. by the use of a breathing apparatus branch line tally and the number of the tally noted in the remarks column of the ECB against the wearers name.

8. There should be not less than two persons outside the access point whilst personnel are inside the confined space.

9. Personnel working in confined spaces should wear breathing apparatus as a matter of routine on all occasions unless the atmosphere in the confined space has been declared free from explosive and flammable risks before personnel and equipment are committed and on a regular basis thereafter.

10. Stage II procedures must be implemented as soon as resources permit.

11. Where an explosion or flammable risk exists the use of intrinsically safe communications and lighting is required.

12. Suitable provision should be made for the respiratory protection and safe recovery of casualties. This must be in addition to the PPE provided to rescuers. Rescue personnel must not in any circumstances remove their own equipment for such purposes whilst in a confined space.

Section 3: Equipment Procedures

Introduction

Objective

To ensure the effective use and maintenance of breathing apparatus (BA) and associated equipment for life safety purposes

Notes on Equipment Procedures

1. From time to time it will be necessary to wear Breathing Apparatus (BA) in conjunction with other equipment designed for specific tasks or which provides additional wearer protection, necessarily these require particular procedures to be followed and are detailed in this chapter.

Air Line Equipment Procedure

Notes on Air Line Equipment

This section refers to the air line equipment referred to in "Air Line Equipment" page 4-13.

1. Air line equipment should be used only under the following circumstances:

   a. **With (full) compressed BA (for the purpose of extending the duration of the apparatus)**
   In these circumstances the air line supply must be connected to the BA set and the wearer should receive the air supply through the facemask of the apparatus. The cylinder valve of the apparatus would normally remain closed and the content of the cylinder held for use in an emergency; or

   b. **Without (full) compressed BA (for the purpose of carrying out work of an extended duration)**
   Such work can only occur when personnel are working within sight of and are in direct oral contact with (e.g. voice, radio) the Entry Control Officer (ECO). In these circumstances each person connected to the air line must have available for immediate use a set of escape BA conforming to the requirements of the appropriate standard (e.g. EN 400 for compressed oxygen self-rescuers, prEN 1146 for open circuit compressed air apparatus with a hood, or BS 4667 Parts 4 or 5). This requirement does not apply in respect of personnel undertaking decontamination procedures in safe air.

2. Each air line face mask should be provided with a BA tally for use when BA is not worn. When the air line is worn without BA the ECO will place the tally on the ECB and will enter "AIR LINE" in the "Time of Whistle" section of the ECB. When BA is worn in conjunction with an air line the tally of the apparatus should be used and marked with the pressure of the cylinder fitted to the apparatus. The ECO will, however not calculate the "Time of Whistle" but will enter "AIR LINE" in this section of the ECB and "WITH BA" in the "Remarks" column.

3. Wearers of air line equipment should not be allowed to enter the risk area unless, at the time of entry, cylinders filled to a pressure of not less than that required to provide a minimum of 4500 litres of air are immediately available throughout the duration of the use of air line equipment. Additionally, at least one filled cylinder suitable for connection to the air line should be immediately available in addition to those actually fitted to the equipment (whether in service or not). Empty cylinders should be replaced immediately by full ones.

4. The air supply to wearers of air line equipment must be under the control of a competent person suitably trained who will not have any other duties. This person is responsible to the ECO for maintaining air supply to the wearers and ensuring that, except for the cylinder in actual use, any remaining cylinders connected to the air line supply equipment are full and that there is an adequate reserve of cylinders.

5. Where it is intended that a single air line should be used by two wearers the air line should terminate in a "Y" piece connector. The connector may or may not be attached to the harness of one of the wearers.

6. The termination of an air line hose (being used by one wearer) and of the second hose of an air line (where the equipment is being used by two wearers) when worn in conjunction with BA, should include a non-return valve(s) arranged to ensure that in an emergency either wearer may open the cylinder valve of his BA (and ensure their own air supply) before disconnecting the air line from their apparatus and withdrawing.

7. When two wearers are connected to an air line both wearers should be aware that they should not disconnect themselves from the air line except in an emergency. Additionally, where two wearers are using an air supply drawn from a single supply hose they should be aware that during very strenuous work the air line might not provide full positive pressure protection throughout the breathing cycle.

8. When air line equipment is worn without BA the air line hose should be secured to the wearer and supported by the belt or harness.

9. No more than two wearers should be connected to a single air line.

Other Air Lines

10. Brigades may provide short lengths of air line, up to 10 metres in length, for specific purposes. These may be used to augment the air supply to BA wearers during decontamination procedures or for emergency rescue purposes and may, or may not, have their own air supply.

11. The use of these air lines may only require connection for a short duration or in exceptional circumstances but, as far as is practicable, the general procedures outlined for the use of air line should be applied.

12. The use of any such equipment which involves two wearers sharing the air supply from a single set of BA should be limited to emergency rescue purposes.

13. No air line equipment should be connected to BA unless the manufacturer of the apparatus has indicated that the connection of the air line does not affect the performance or safety of the apparatus.

Air Line Connectors to BA

14. Where BA is provided with an additional connector or connectors in the air supply system to the wearer, any such connectors are not to be used for any purpose other than:

    a. To provide an additional supply of air to the wearer of the apparatus; or

    b. To supply air to another person through a face piece where this is necessary to facilitate rescue from an emergency situation.

Chemical Protective Clothing

Objective

To provide additional protection to a Breathing Apparatus (BA) wearer in operational circumstances involving the possibility of exposure to hazardous substances.

Notes on Chemical Protective Clothing

1. Additional information on incidents involving the use of Chemical Protective Clothing is contained in the Fire Service Council's, Junior Officer Handbook:

   a. Operational Procedures for Hazardous Material Incidents, page 4-21.
   b. Agri-chemicals / Fertilisers, page 4-22.
   c. Anhydrous Ammonia, page 4-25.
   d. Asbestos, page 4-27.
   e. Bio-hazards, page 4-29.
   f. Radiation, page 4-37.
   g. Aircraft, page 4-47.

2. Advice on operational procedures for safe working at incidents involving the use of Chemical Protective Clothing is included in the Fire Service Ancillary Safety Statement, which should be read in conjunction with this guidance. In addition the Ancillary Safety Statement includes generic risk assessments in the following related areas:

   a. Fighting fires in Farms;
   b. Fighting fires in Refuse;
   c. Fighting fires on Road Networks;
   d. Fighting fires on Rail Networks; and
   e. Aircraft incidents.

3. There are some operational incidents where normal firefighter protective clothing affords inadequate protection against hazardous substances. In circumstances requiring the use of chemical protective clothing, BA must always be used. It should be noted that:

a. There is potential for increased air consumption rates and heat stress whilst wearing chemical protection suits, especially where physical activity or high ambient temperatures are involved;

b. Exposure time in the risk area may need to be limited to 20 minutes. The Entry Control Officer (ECO) will need to monitor the elapsed time; and

c. There may be implications for the level of BA control, the application of the procedures, and communications. In particular the Incident Commander will need to be aware of the potential early deployment of relief teams.

4. Whilst decontamination procedures are not considered within the full scope of this guidance, the Incident Commander, liasing with ECOs will need to ensure sufficient air is available to allow for decontamination following withdrawal from the risk area.

Thermal Imaging Cameras

Objectives

To aid the safe passage of firefighters and the location of casualties and fires.

Notes on the use of Thermal Imaging Cameras (TICs)

1. TICs are an aid to safe passage and rescue, but when in use recognised BA procedures should continue to be applied. Firefighters should be trained in the use of TICs, particularly when used in conjunction with BA. It is essential that a firefighter using a TIC has an understanding of the images caused by temperature changes.

Procedures for use with Thermal Imaging Cameras (TICs)

2. On arrival at an incident, the Incident Commander will need to decide whether or not to use a TIC. TICs are not intrinsically safe and as such should not be used in a flammable atmosphere. The practicalities of using a TIC with communications equipment, BA guidelines and firefighting equipment must be assessed, especially when nominating team numbers, which should always be sufficient to include an appropriate means of firefighting at incidents where fire is, or may become involved.

3. Following a decision to use a TIC the following procedures apply:

    a. The BA Entry Control Officer (ECO) will record on the ECB that a TIC is in use, the task being performed and its location;

    b. The team leader should not be the TIC operator;

    c. A methodical search pattern should be used (should the camera fail, egress would otherwise be more difficult, especially if no other senses were used to gain access to the risk area); and

    d. The BA team leader should ensure that the team pauses at regular intervals to allow the camera operator to scan the area. All relevant information should be relayed to the BA ECO via the team leader.

4. Additional information on the use of Thermal Imaging Cameras is contained in the Fire Service Council's, Junior Officer Handbook:

   a. Fires in Buildings with Sandwich Panel Construction, page 4-19.
   b. Large Building Fires, page 4-11.

Section 4: Equipment Maintenance, Testing & Description

Introduction

Objective

To ensure the effective use and maintenance of Breathing Apparatus (BA) and associated equipment for life safety purposes.

Notes on Equipment

1. BA is designed to support life. It is provided for life safety purposes. It is essential, therefore, that the very highest standards of testing, maintenance and record keeping should apply. Equal attention should be given to cleanliness and stowage of the apparatus and its associated equipment. BA wearers of all ranks need to maintain a high level of proficiency in the procedures for, and the use of, BA and the equipment supplied to enhance its effectiveness and safety.

2. Additional information on testing and servicing is contained in the Fire Service Council's, Junior Officer Handbook, page 5-3.

Pre Entry Test

1. The "Pre Entry Test" of the apparatus should include:

   a. donning the Breathing Apparatus (BA) in accordance with the manufacturer's instruction or as stipulated by the Fire Authority;

   b. activate the reset facility and open the cylinder valve fully and confirm the cylinder content, which at the time of test should be not be less than 85% of full capacity;

   c. check the operation of the apparatus by twice inhaling and exhaling deeply, and whilst holding the breath after the second inhalation, ensuring that no air flow from the apparatus is audible;

   d. the operation of any supplementary air flow facility;

   e. ensuring the pneumatic integrity of all pressurised parts of the apparatus is maintained, including the facemask whilst pressurised to the normal working pressure (to the limits specified by the manufacturer);

   f. ensuring the low pressure warning whistle operates at the correct pressure by closing the cylinder valve and breathing;

   g. ensuring the pressure gauge correctly returns to zero;

   h. open cylinder valve fully and breathe normally; and

   i. check that radio communications are operating effectively (if available).

General Checks

2. General Checks of the apparatus should include all "Pre Entry Tests" listed in paragraph 1 above and the following:

   a. The fastening of all finger-tight connections;

   b. Thoroughly examining the apparatus, its fittings and any cylinders and covers for damage or excess wear;

   c. Examining the facemask for clear vision;

   d. Completing the entries on the tally attached to the apparatus;

   e. Ensuring the ADSU operates effectively;

   f. Inspecting the lamp to be used with the apparatus and checking it by operation;

   g. Examining the personal line to ensure that it is correctly packed in its pouch and is correctly fitted to the harness of the apparatus;

   h. Where the apparatus is stowed on an appliance, checking that it is correctly secured to its bracket and that any fastening device is working correctly.

Monthly Test

3. This test should include:

   a. A minimum wearing duration of 50 bars (itself preceded by the appropriate tests described in paragraphs 1 and 2 above). This can be part of normal wear at a drill or incident provided it is of at least the minimum duration stated above, followed by:

      (i) Removing the cylinder from the apparatus;

      (ii) Examining the cylinder retaining strap(s) and fastening(s) for damage or wear;

      (iii) Examining the apparatus harness and its attachment points for signs of damage, wear or deterioration due to the action of chemicals;

(iv) Examining the attachment points for the ADSU and personal line;

(v) Checking the security of all connection points in the air supply system;

(vi) Refitting the cylinder filled to at least 90% of the normal maximum pressure; and

(vii) Carrying out the tests and actions described in paragraphs 1 and 2 above.

The apparatus must be tested when it has been worn at an operational incident or otherwise and, on issue, and should include all the test items described in paragraph 3.a. (i) to (vii) inclusive.

Testing - General

4. The tests of closed-circuit BA should, otherwise, be as specified by the manufacturer.

5. The rubber and neoprene components of BA are liable to deteriorate from exposure to aggressive chemicals, ozone and from ageing. Such components should frequently be examined for signs of this deterioration and the advice of the manufacturers should be sought on the maximum service life of such components in ideal conditions. Replacement policies should reflect the advice provided by manufacturers.

6. Testing of BA should be carried out only by a competent person. Other than the procedures set out in this document, BA maintenance invariably requires the use of specialist equipment and should be carried out only by personnel who have received the necessary training to a standard approved by the manufacturer of the apparatus.

7. Manufacturers may recommend that BA hoses designed to operate at pressure higher than that of atmosphere should be periodically subjected to a test pressure 100% higher than the normal working pressure. Such pressure testing shall be carried out pneumatically or hydraulically but in either case suitable safeguards should be employed to ensure that no person is put at risk in the event of failure of the hose under test.

8. A test record must be permanently kept with each BA set (except when it is carried on an operational appliance) detailing the:

a. date and time of each test carried out on the apparatus and its ancillary equipment and the result;

b. type of test carried out and the reason for it;

c. name and signature of the person carrying out the test;

d. nature of any defects found; and

e. nature of any repairs or adjustments and the identity of any person carrying them out.

Breathing Apparatus (BA) Identification Tallies

1. Tallies for use with BA conform to a standard design which is shown in Appendix 3. The dimensions of tallies can vary.

2. The standard design of a tally includes permanent markings which identify:

   a. The name of the Brigade/service;

   b. The name of the station to which the apparatus is allocated;

   c. The type of apparatus (e.g. compressed air, oxygen) and the cylinder capacity (in litres); and

   d. The number of the apparatus and/or the station identification number allocated to the apparatus.

3. The standard design of tally also includes permanent markings with spaces which allow entries to be made with a suitable waterproof marker to record:

   a. The name of the wearer of the apparatus;

   b. The indicated cylinder pressure of the apparatus;

   c. The "Time In", e.g. the time of handing the tally to the Entry Control Officer (ECO) (see "Duties of Stage I ECO" page 1-9, "Duties of Stage II ECO" page 1-15 and "BA Main Control" page 1-17);

   d. The radiation dosimeter readings at the time of entry into and leaving the risk area.

4. BA identification tallies provided for use with air line facemasks when the air line is not being used in conjunction with a BA set (see "Air Line Equipment" page 4-13) should additionally be permanently marked "Air Line" in the space provided to record cylinder pressure.

5. Procedures for recording information in the spaces provided on BA identification tallies are described in "Duties of Stage I ECO" page 1-9 and "Duties of Stage II ECO" page 1-15.

6. The standard dimensions of BA tallies are important as they permit a tally to be inserted in any BA Entry Control Board (ECB) operated by any Fire Brigade.

7. BA tallies must conform to standard colours. (A rigid, self-coloured plastic tally in white or bright yellow to permit suitable waterproof markings to show up well). The permanent markings on the tally should be durable, indelible, black in colour and conform to the layout in Appendix 3.

The standard colour coding for identification tallies is as follows:

COLOUR	TYPE OF APPARATUS	CYLINDER CAPACITY
White	Closed-circuit oxygen	Any
Yellow	Open-circuit (compressed air)	Any

8. The BA tally should be attached by means of a key ring to the key of the ADSU provided with each BA and air line facemask.

Breathing Apparatus (BA) Entry Control Boards (ECBs)

Rapid Deployment

1. Rapid Deployment Procedures may be operated using existing ECBs with appropriate timing devices. Alternatively, an ECB designed specifically for the purpose may be used accommodating a timing device and two BA tallies (see "Rapid Deployment Procedures" page 1-6). An example of a Rapid Deployment ECB is shown in Appendix 4. A Rapid Deployment ECB should comprise a timing device and positions for the insertion of two BA tallies. When depressed by the insertion of the first tally, the contact breaker automatically operates the timing device and the elapsed time is indicated on the board. When both tallies are removed the elapsed time should stop and remain visible until action is taken to reset the timing device. The Rapid Deployment ECB may be made from materials used from other ECBs, and BA tallies are retained in a similar manner. The design of the Rapid Deployment ECB should allow for the introduction of full control procedures without the loss of information about elapsed time.

Stage I and Stage I I

2. The ECB comprises of a perspex-covered board about 300mm in width and 850mm in length. The upper section contains a set of tables or a calculator for calculating the expected working duration of BA. It also incorporates a clock. The remainder of the board has up to twelve divisions into which BA tallies can be inserted. Two divisions are permanently marked and intended for the tallies of the emergency team. Corresponding spaces permit entries under the headings:

    a. "Time of Whistle"
    b. "Location of Team"
    c. "Remarks"

3. The upper portion of an ECB can include a "TACOL" or similar grid to assist the ECO in consolidating information on casualties removed from the risk area. T (team), A (number of adult casualties), C (number of child casualties), O (represents a clock face / time "out"), L (location).

4. A pouch may be attached to the board to house such items as the ECO's tabard, guide line identification tallies, a suitable waterproof marker, sharpener, notebook, pen and an evacuation whistle. A BA Entry Control Board (ECB) is illustrated at Appendix 5, and a method of securing tallies in the board is illustrated at Appendix 6. Alternative methods of securing tallies are acceptable. The board may be provided with a stand or other means of support.

5. Clocks for use with BA ECBs may be digital or analogue in type and the former may display times in a 12 or 24 hour mode. The performance and display characteristics of some liquid crystal display digital clocks are adversely affected by extremes of temperature and brigades should satisfy themselves of the satisfactory performance of the clocks intended for this use.

6. Duration tables should cover all types of cylinders fitted to BA used in the Brigade. Ideally the table should also include duration tables relating to the cylinders used by surrounding Brigades. Duration tables for each cylinder type should be calculated using the formulae described in Appendix 7. Duration tables should extend from the normal maximum filled pressure of each cylinder and should show the remaining duration for decreasing pressures. The background of each section of the duration tables should be coloured to correspond to the colour of the BA tally. As an alternative to the use of duration tables the ECB may be fitted with a mechanical calculator for the same purpose.

7. The ECO should, as soon as possible after being nominated, examine the ECB of the appliance to which they are attached. This should include that it is:

a. clean and with no previous entries displayed;
b. free from damage or signs of excessive wear;
c. provided with a suitable waterproof marker;
d. fitted with a clock which is functioning and indicating the correct time; and
e. stowed on the appropriate appliance.

BA Main Control

8. A board should be provided for the use of the BA Main Control Officer (MCO). Examples of Main Control Boards (MCBs) are illustrated in Appendix 2.

BA Tabard

9. A yellow and black chequered tabard should be provided for the use of BA Entry Control Officers (Stage I and Stage II) and for the use of BA Main Control Officers (see "BA Main Control" page 1-17).

10. It is recommended that the tabard be stowed on appliances with the ECB with which it is intended to be used.

11. BA tabards should be examined for damage and excessive wear by the person nominated as the ECO.

Breathing Apparatus (BA) Guidelines

1. A BA guideline is made from unpolished, usually plaited, rot resistant hemp or non-thermoplastic synthetic material. The guideline has a circumference of 19 to 25mm (diameter 6 to 8mm) and is 60 metres in length (see illustration in Appendix 8). One end of the guideline terminates in a spliced loop 150mm in length and the "pay-out" end of the line is provided with a snap hook.

2. "Tabs" are fitted in pairs to the line at 2.5 metre intervals along the length of the line. In each pair, one of the tabs (the tab nearer the pay-out end) is knotted and is 50mm in length. (The second tab is 125mm in length and is unknotted). A container is provided into which the line is stowed in random fashion. A further snap hook is provided inside the container to which the loop of the guideline is attached before the remainder of the line is stowed in the container. The container has a hole, normally in the lid, to permit deployment of the guideline. The container is designed to be securely attached, by way of quick release fastenings, to a BA wearer or the wearer's BA set.

3. All BA guidelines should be tested in accordance with the procedures described in Appendix 9.

BA Guideline Tallies - General

4. Two separate sets of tallies should be provided: one to permit the identification of two separate main BA guidelines and the other to permit identification of up to four branch guidelines.

Main Guideline Tallies

5. Each set of main guideline tallies comprises two discs 75mm in diameter, each durably marked on both sides by the identifying letters "A" or "B". Each tally has a fitting to permit its attachment to the ring of the snap hook at the pay-out end of a main guideline. Illustrations of tallies are included in Appendix 10.

Branch Guideline Tallies

6. Each set of branch guideline tallies comprises four rectangular tallies, 100mm by 50mm. Each one is drilled by 15mm holes to identify the number of the tally (e.g. 1 hole for the number one tally). Each tally has a fitting to permit its attachment to the ring of the snap hook at the end of a branch guideline.

7. Illustrations of both types of tally are at Appendix 10. BA guideline identification tallies should be inspected monthly and after use.

BA Personal Line

8. The BA personal line is 6m long. The line is illustrated in Appendix 11. One end of the line should be fastened to a "D" ring which is passed through a shaped slot in the rear of the personal line pouch to permit this fastening. A snap hook (see Appendix 12) or karibiner (see Appendix 13) is fastened to the other end of the personal line. A further "D" ring is permanently fastened to the line 1.25m from the snap hook or karibiner at the running end. In normal stowage the second "D" ring is secured to a short length of strap by a clip. The strap is secured to the removable ring anchoring the standing end of the personal line to the BA harness. This method of fastening permits the personal line to be paid out in two separate lengths; a short length of 1.25m and, by releasing the clip, the full 6m length of line.

9. The line is stowed in the pouch attached to the harness of the BA set. This is provided with internal pockets, the smaller of which accommodates the 1.25m length of line and the largest pocket houses the snap hook or karabiner. (The method of stowage is shown in Appendix 14).

10. BA personal lines should be examined in accordance with the test procedure described in Appendix 9 and as part of the general check of the BA to which it is attached to ensure that it is correctly secured to the apparatus and correctly stowed in the pouch.

Air Line Equipment

1. The rubber and neoprene components of air line equipment are liable to deteriorate as a result of exposure to aggressive chemicals, ozone, sunlight and from ageing. These should be examined frequently for signs of this deterioration and the advice of the manufacturers should be sought on the maximum service life of such components in ideal conditions. Replacement policies should reflect this advice.

2. Testing of air line equipment should only be carried out by persons who are qualified to wear the apparatus. Maintenance of air line equipment which involves more than the routine maintenance which follows its wearing invariably requires the use of specialist test equipment and should be carried out only by personnel who have received the necessary training to a standard approved by the manufacturer of the equipment.

3. Manufacturers may recommend that BA hoses designed to operate at pressure higher than that of atmosphere should be periodically subjected to a test pressure 100% higher than the normal working pressure. Such pressure testing shall be carried out pneumatically or hydraulically but in either case suitable safeguards should be employed to ensure that no person is put at risk in the event of failure of the hose under test.

4. Permanently kept with each set of air line equipment should be a test record detailing the:

    a. date and time of each test carried out on the air line and its ancillary equipment and the result;

    b. type of test carried out and the reason for it;

    c. name of the person carrying out the test;

    d. nature of any defects found in the apparatus; and

    e. nature of any repairs or adjustments and the identity of any person carrying them out.

Radio Communications

Using Breathing Apparatus (BA)

1. The use of radio communications equipment can assist BA operations under all entry control procedures. It can be an aid to the effectiveness and safety of BA wearers. Details in relation to radio channels for BA personnel, ECO's, Incident and Sector Commanders are contained in the National Incident Command Manual.

2. Radio equipment utilised with BA should be suitable for the environment in which it is to be used. Where this may involve exposure to a flammable or explosive atmosphere the radio equipment and any BA interface used with it should be certified as being safe for use in such conditions.

3. Users should be aware of the limited penetration of radio signals into buildings and below-ground structures. In the event of a breakdown of radio communications, it must be a question of judgement whether, in the circumstances, an emergency team should be deployed.

4. Radio communications equipment should be tested, by operation, before it is committed to the risk area and at regular intervals whilst in use.

Appendix 1

Duration Tables

FIRST ENTRY

PRESSURE IN BARS	200	190	180	170	160
TIME IN MINUTES	48	45	42	39	36

2400 LITRES

RE ENTRY

PRESSURE IN BARS	150	140	130	120	110	100
TIME IN MINUTES	33	30	27	24	21	18

FIRST ENTRY

PRESSURE IN BARS	200	190	180	170	160
TIME IN MINUTES	44	41	38	36	33

2250 LITRES

RE ENTRY

PRESSURE IN BARS	150	140	130	120	110	100
TIME IN MINUTES	30	27	24	21	18	16

FIRST ENTRY

PRESSURE IN BARS	200	190	180	170	160
TIME IN MINUTES	33	31	28	26	24

1800 LITRES

RE ENTRY

PRESSURE IN BARS	150	140	130	120	110	100
TIME IN MINUTES	21	19	17	15	12	10

FIRST ENTRY

PRESSURE IN BARS	132	120	110
TIME IN MINUTES	19	16	13

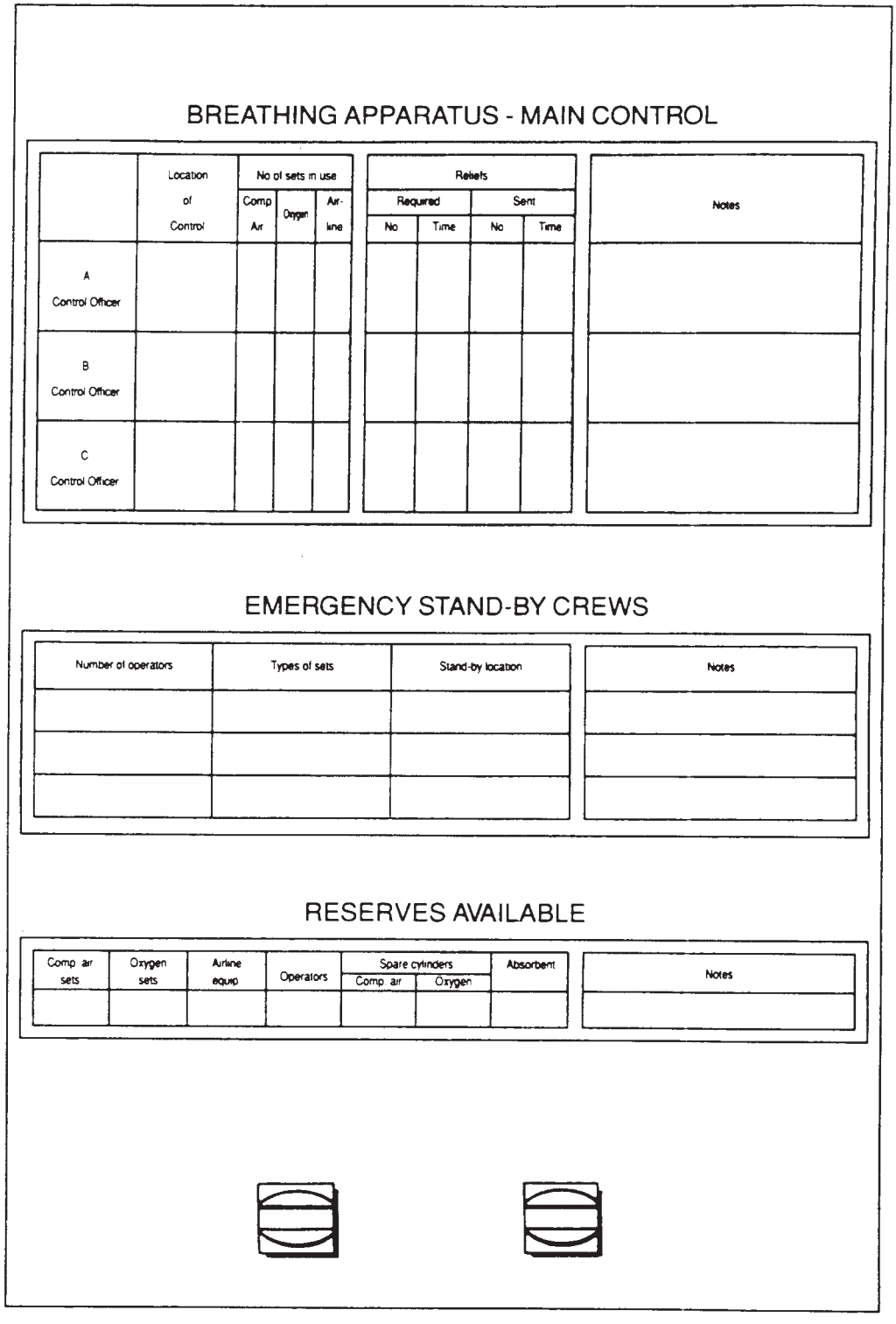
1240 LITRES

RE ENTRY

PRESSURE IN BARS	100
TIME IN MINUTES	11

Appendix 2

BA Main Control Boards



BREATHING APPARATUS - MAIN CONTROL

	Location of Control	No of sets in use			Reliefs				Notes
		Comp Air	Oxygen	Air-line	Required		Sent		
					No	Time	No	Time	
A Control Officer									
B Control Officer									
C Control Officer									

EMERGENCY STAND-BY CREWS

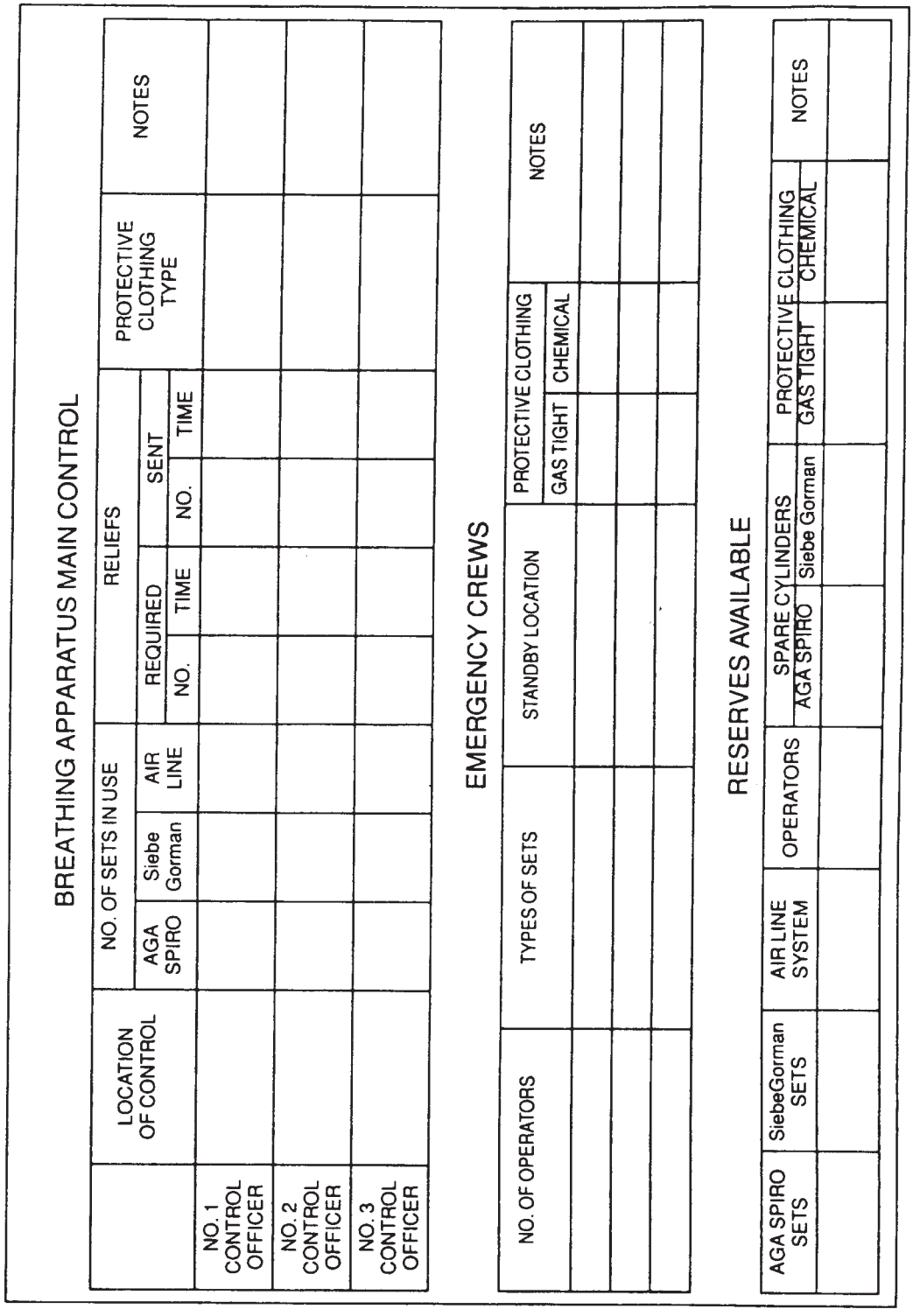
Number of operators	Types of sets	Stand-by location	Notes

RESERVES AVAILABLE

Comp air sets	Oxygen sets	Airline equip	Operators	Spare cylinders		Absorbent	Notes
				Comp air	Oxygen		

Appendix 2

BA Main Control Boards



BREATHING APPARATUS MAIN CONTROL

	LOCATION OF CONTROL	NO. OF SETS IN USE			RELIEFS				PROTECTIVE CLOTHING TYPE	NOTES
		AGA SPIRO	Siebe Gorman	AIR LINE	REQUIRED NO.	REQUIRED TIME	SENT NO.	SENT TIME		
NO. 1 CONTROL OFFICER										
NO. 2 CONTROL OFFICER										
NO. 3 CONTROL OFFICER										

EMERGENCY CREWS

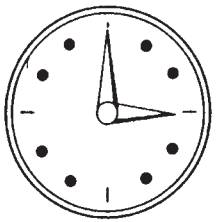
NO. OF OPERATORS	TYPES OF SETS	STANDBY LOCATION	PROTECTIVE CLOTHING		NOTES
			GAS TIGHT	CHEMICAL	

RESERVES AVAILABLE

AGA SPIRO SETS	SiebeGorman SETS	AIR LINE SYSTEM	OPERATORS	SPARE CYLINDERS		PROTECTIVE CLOTHING		NOTES
				AGA SPIRO	Siebe Gorman	GAS TIGHT	CHEMICAL	

MAIN CONTROL OFFICER

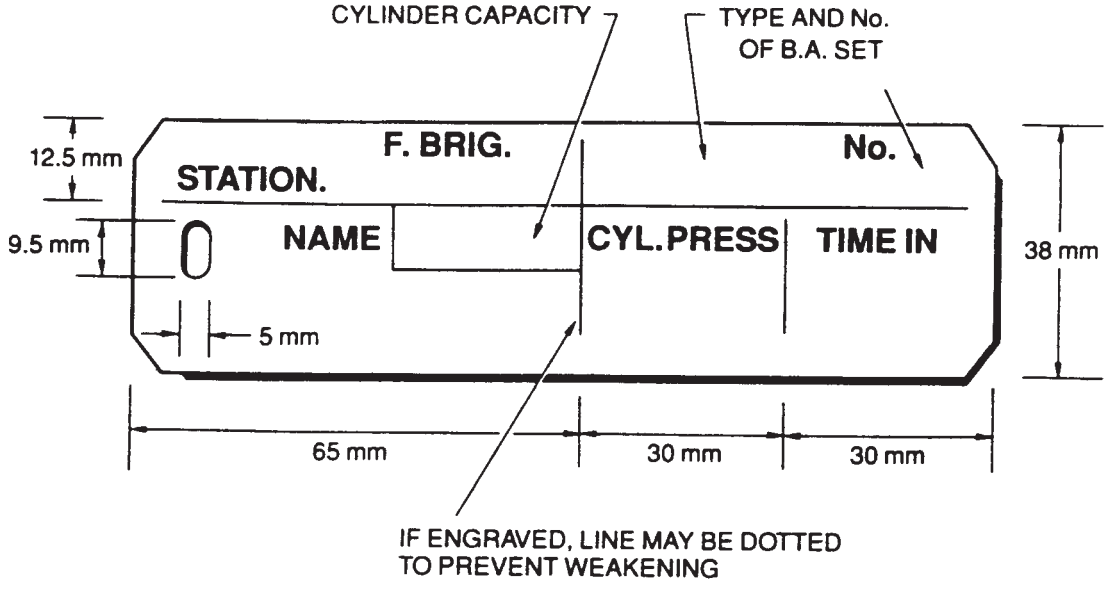
B. A. MAIN CONTROL BOARD

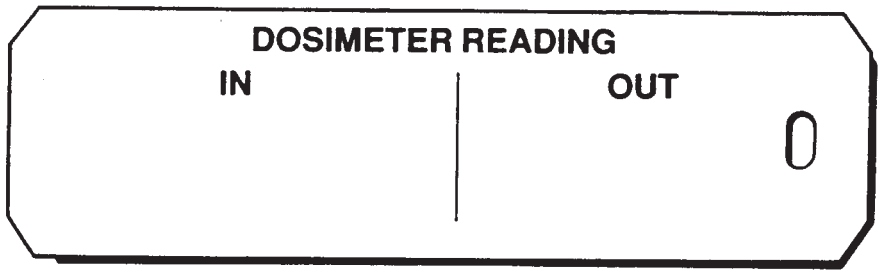


E.C.P. LOCATION NAME OF E.C.O.	NO. SETS IN USE	RELIEFS NO. REQ'D	 NO. & TIME SENT	EMER-GENCY CREW/S LOCATION	NOTES	RESERVES BEING SERVICED	 OPERATIONAL
E.C.P. No. 1.							
E.C.P. No. 2.							
E.C.P. No. 3.							
E.C.P. No. 4.							

Appendix 3

BA Identification Tally





REVERSE SIDE OF TALLY

MATERIAL: PLASTIC BETWEEN 1.5 mm AND 2 mm THICK

TALLIES COLOURED AS FOLLOWS

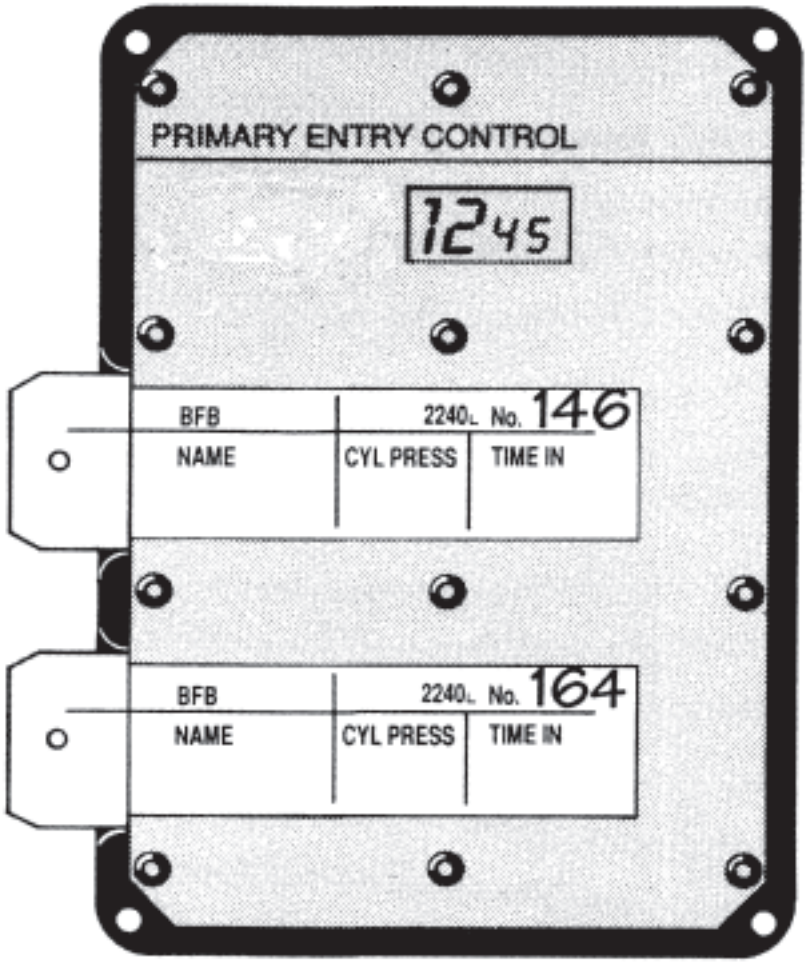
COLOUR	TYPE OF SET	WORKING DURATION
YELLOW	COMPRESSED AIR	———
WHITE	OXYGEN	45 MINS.–90 MINS.

THE COLOURS TO BE WHITE OR BRIGHT YELLOW SO THAT A SUITABLE MARKER WILL SHOW UP WELL

Identification Tally

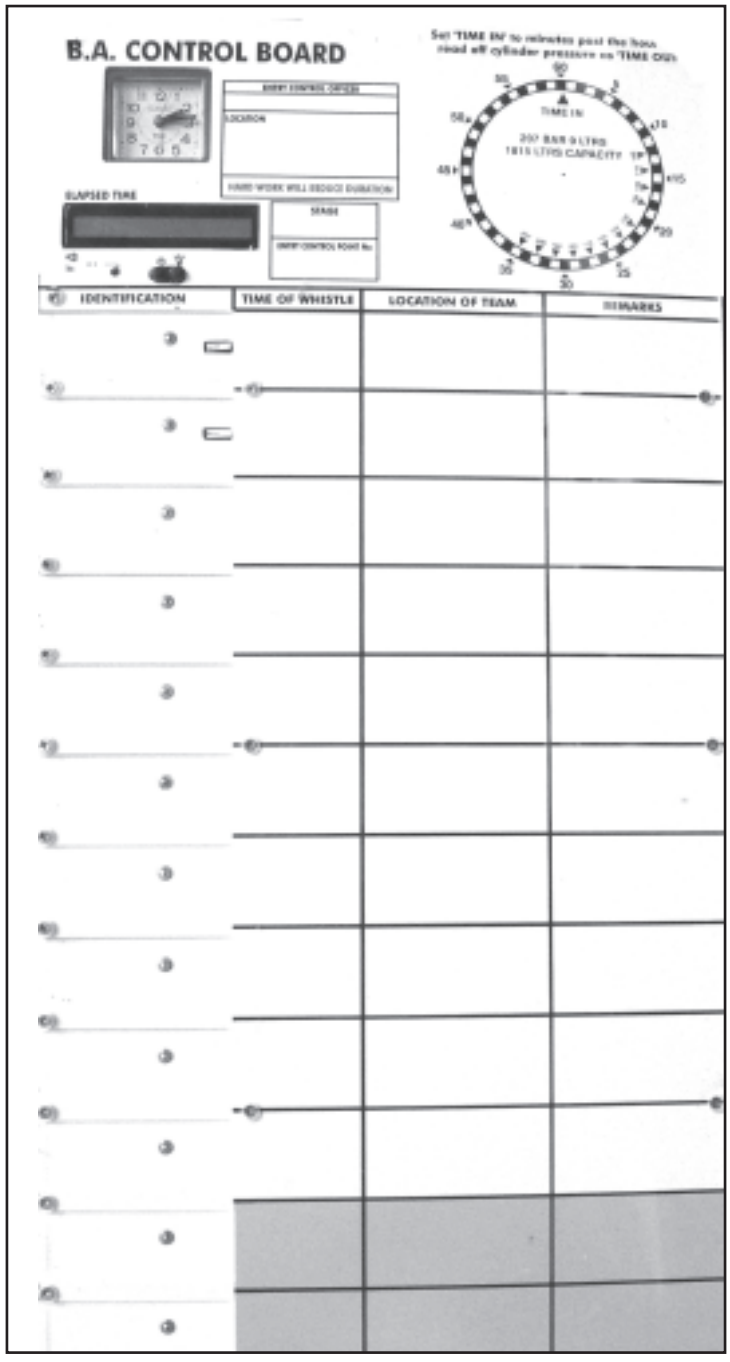
Appendix 4

Rapid Deployment Board



Appendix 4

Rapid Deployment Board



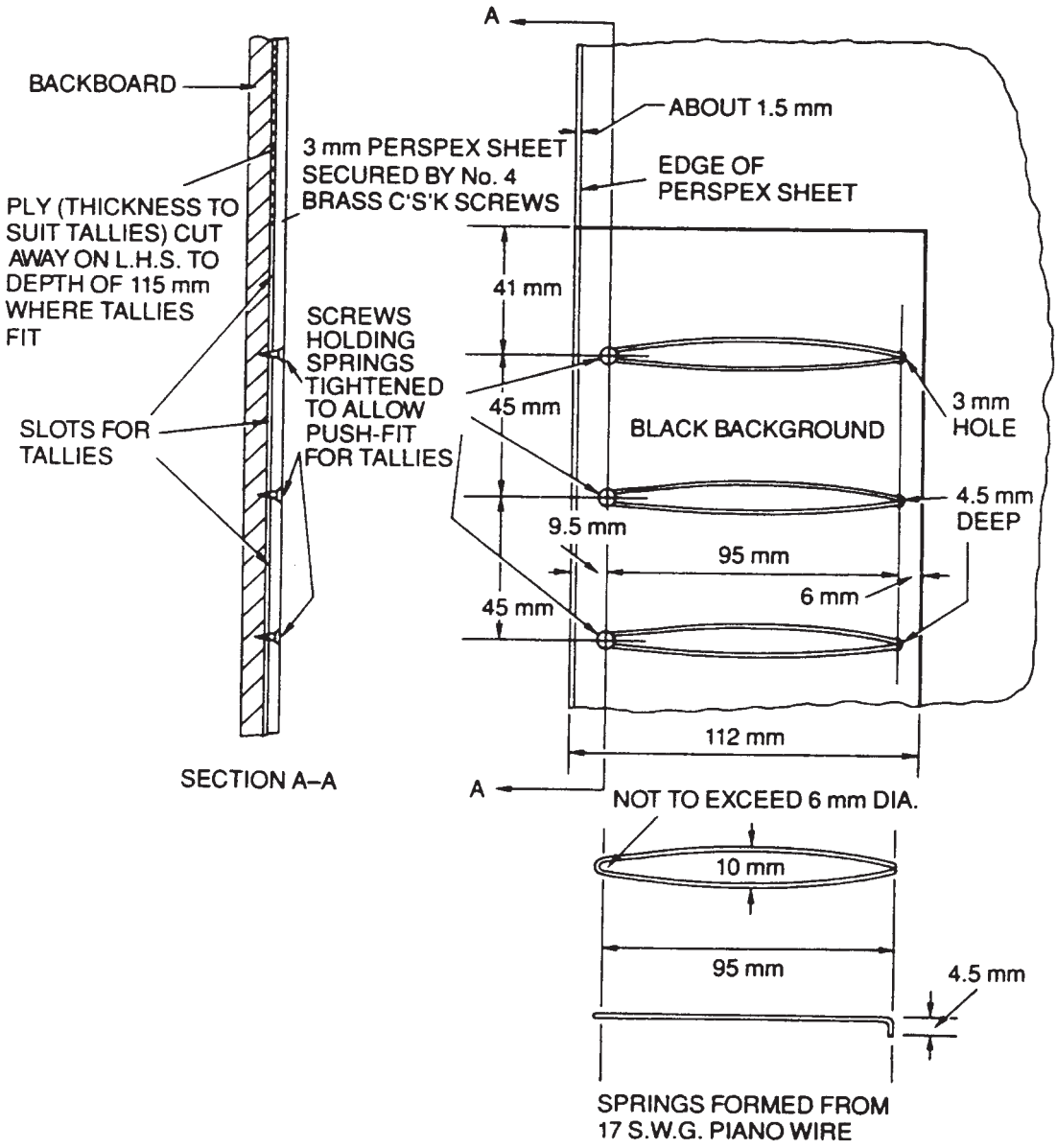
Appendix 5

Breathing Apparatus Entry Control Board Stage I and Stage II

Entry Control Point Number:	(Name of Fire Authority) B.A. Entry control Board		Stage
Clock	Duration Tables and/or Dial Calculator		
Identification	Time of Whistle	Location of Team	Remarks
Emergency Team			
Emergency Team			

Appendix 6

Details of springs and slots for tallies



Appendix 7

Consumption of air formula

Open circuit apparatus

1. A table showing the remaining working duration of open circuit BA can be calculated for any cylinder pressure by using the following formula:

$$D = \frac{P \times C}{N \times 40} - 12$$

Where:

D = the remaining working duration (in minutes)
P = the pressure in the cylinder (bar)
N = the maximum filled pressure of the cylinder (bar)
C = the capacity (in litres) of the cylinder when pressurised to 'N' bar

The figure 40 used in the calculation represents the notional consumption rate used in estimating the average consumption of an open circuit apparatus and approximates to a wearer walking at a speed of 6 km/hour. The figure 12 represents the period allotted to the Safety margin of the apparatus in minutes.

Closed circuit apparatus

2. A table showing the remaining duration of closed circuit BA can be calculated for any cylinder size and for decreasing valuses of the cylinder pressure by uing the following formula:

$$D = \frac{P \times C}{N \times F} - 15$$

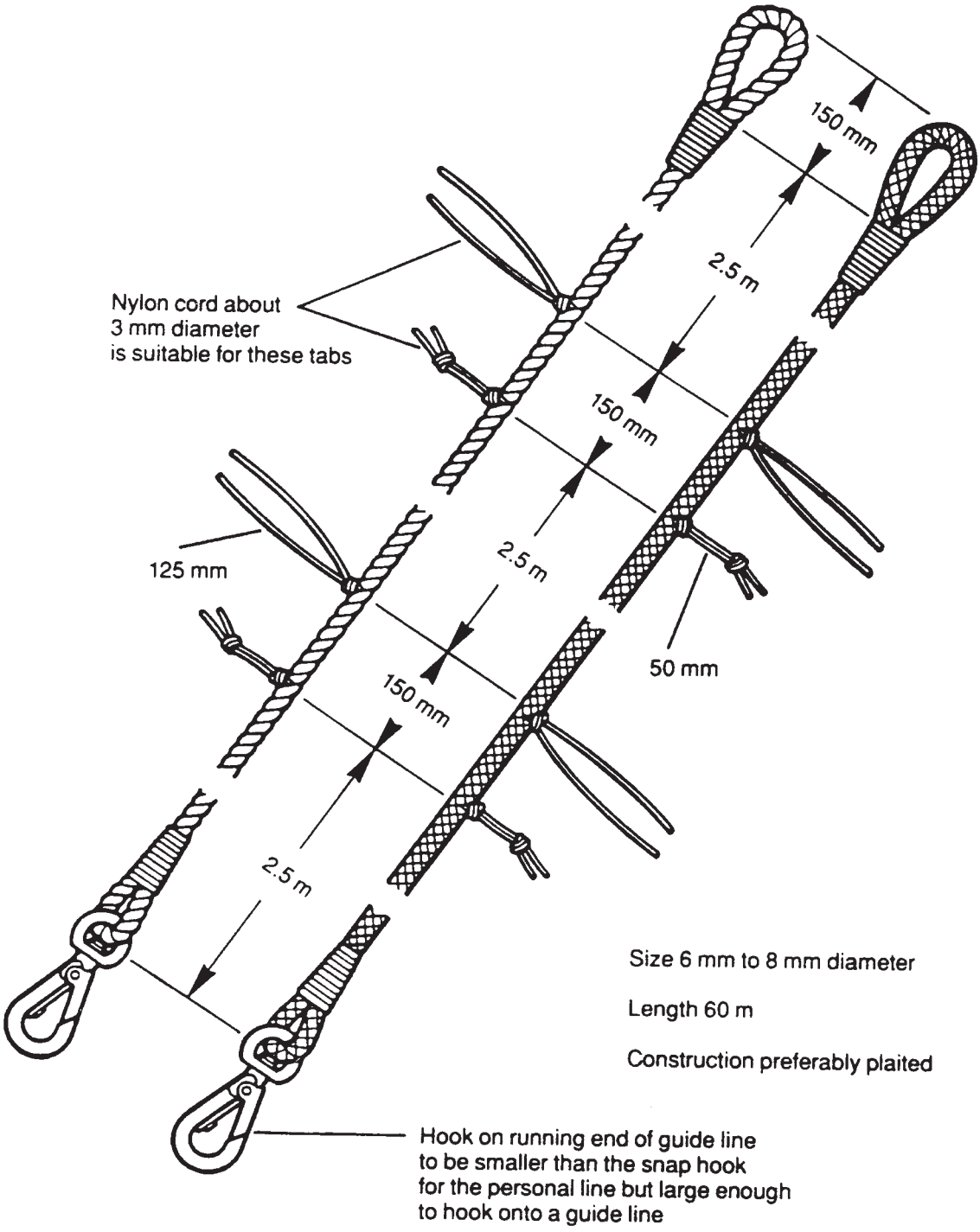
Where:

D = the remaining working duration (in minutes)
P = the pressure in the cylinder (bar)
N = the maximum filled pressure of the cylinder (bar)
C = the capacity (in litres) of the cylinder when pressurised to 'N' bar
F = the constant flow rate of the apparatus (in litres/minutes)

The figure 15 represents the period allotted to the Safety Margin of the apparatus in minutes.

Appendix 8

BA Guidelines



Appendix 9

BA Guideline Test Procedure

Examination

1. Guidelines and personal lines used with breathing apparatus should be examined as follows:

   a. The whole length of the line should be examined about 300mm at a time and should be turned to reveal all sides of the 300mm before passing on to the next;

   b. Hawser-laid ropes should be slightly untwisted locally at intervals of not more than 300mm to reveal the inner surface of the strands. The strands must be returned to their original position afterwards; and

   c. Attention should be given to the whippings, splices and fittings, such as swivels, snap hooks etc. to ensure that they are free from defects.

Note: The main cause of deterioration and the signs by which they may be recognised are described in the Manual of Firemanship, Book 2, Chapter 10 "Deterioration of rope". (Published by HMSO for the Home Office, UK).

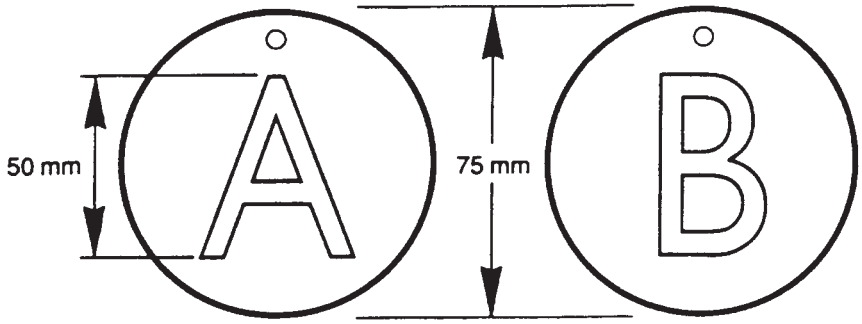
Tests

2. One end of the line should be secured to an immovable object in such a way that the line and any splices in it will be subjected to the test. Two firefighters spaced at intervals of about 1.5 metres should take up positions at the free end of the line and should successively apply a steady pull to the line until the line is subjected to the combined pull of the two firefighters. The combined pull should be maintained for 20 seconds and then released by the firefighters in succession, from the rear. The line should then be reversed and the test repeated. When lines terminate in an eye splice and snap hook, the snap hook should be attached to the immovable object.

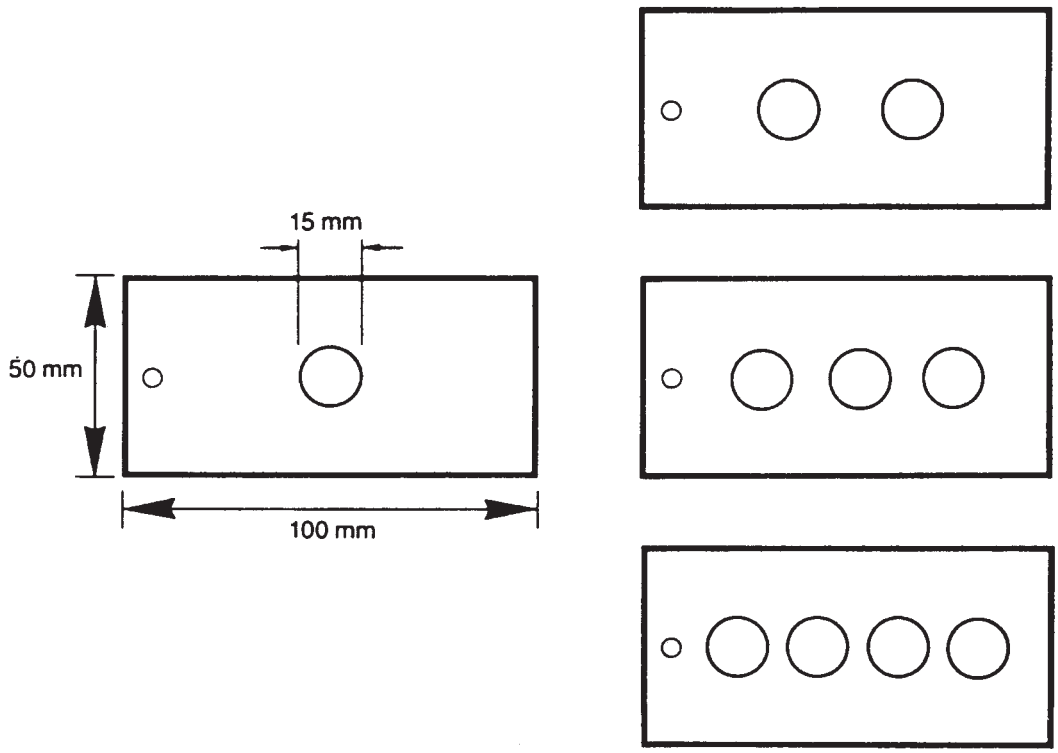
Appendix 10

BA Guideline Tallies

A MAIN GUIDE LINE
(2 TALLIES)

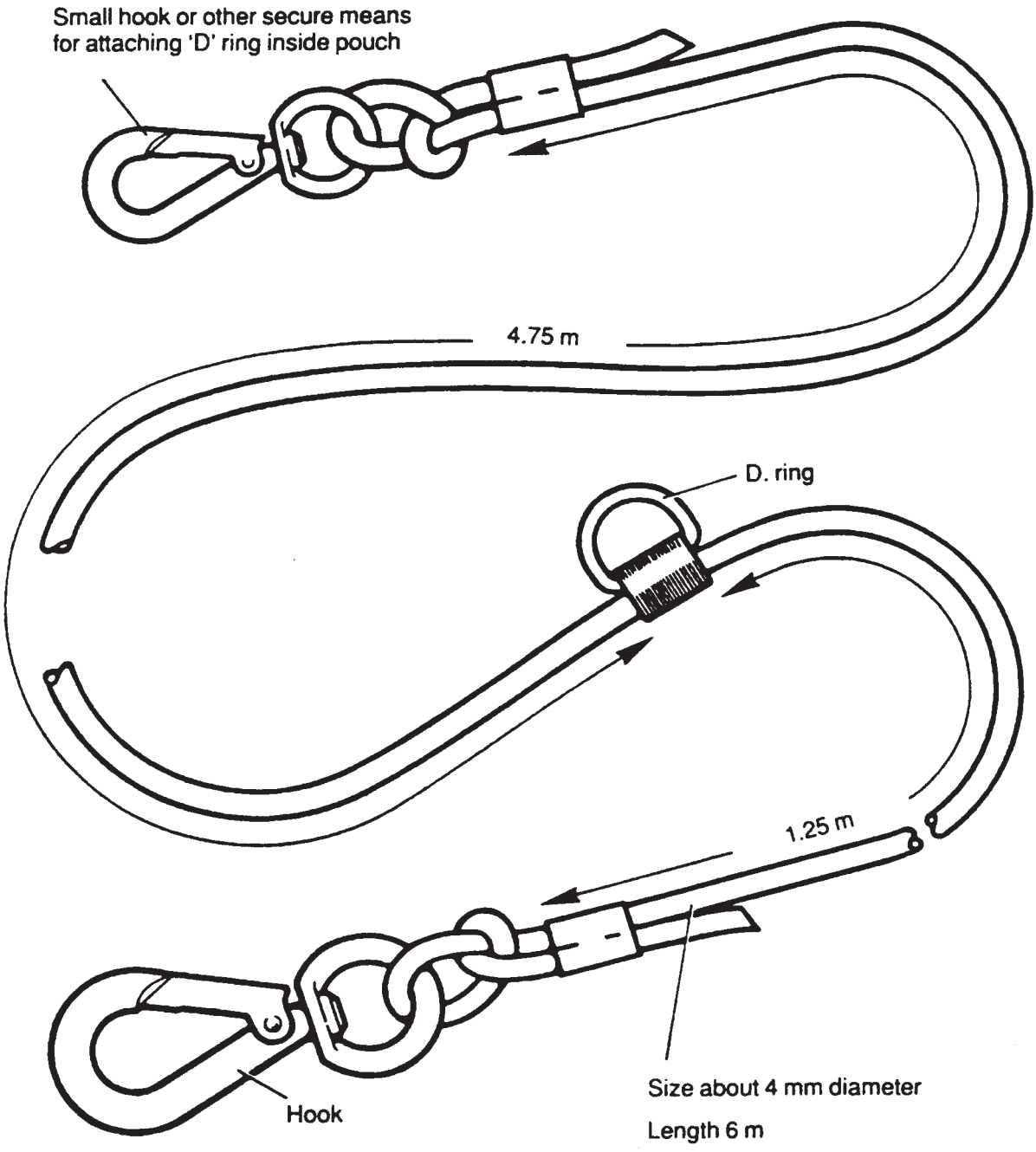


B BRANCH GUIDE LINE
(4 TALLIES)



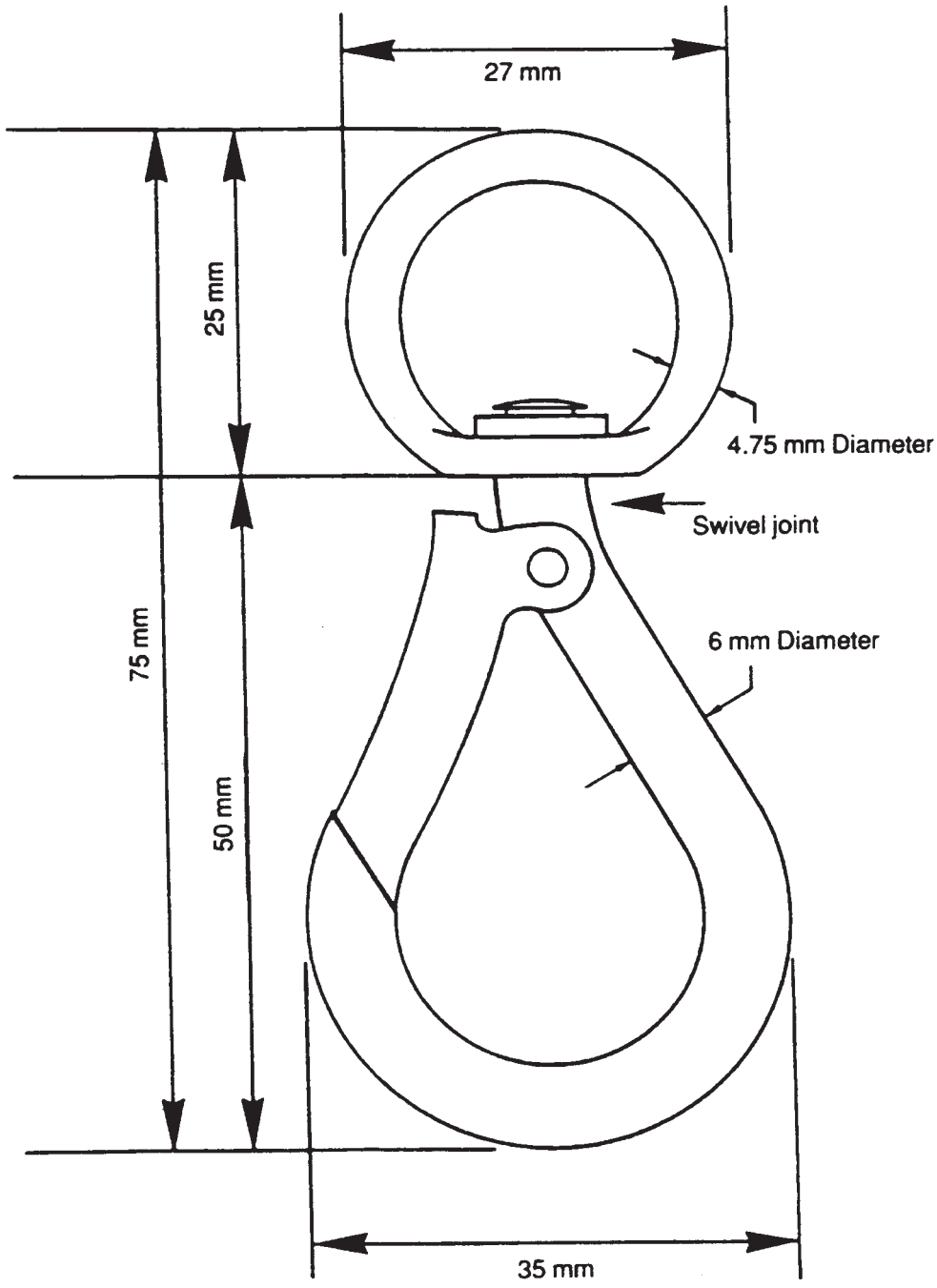
Appendix 11

Personal Lines



Appendix 12

Hook for personal line



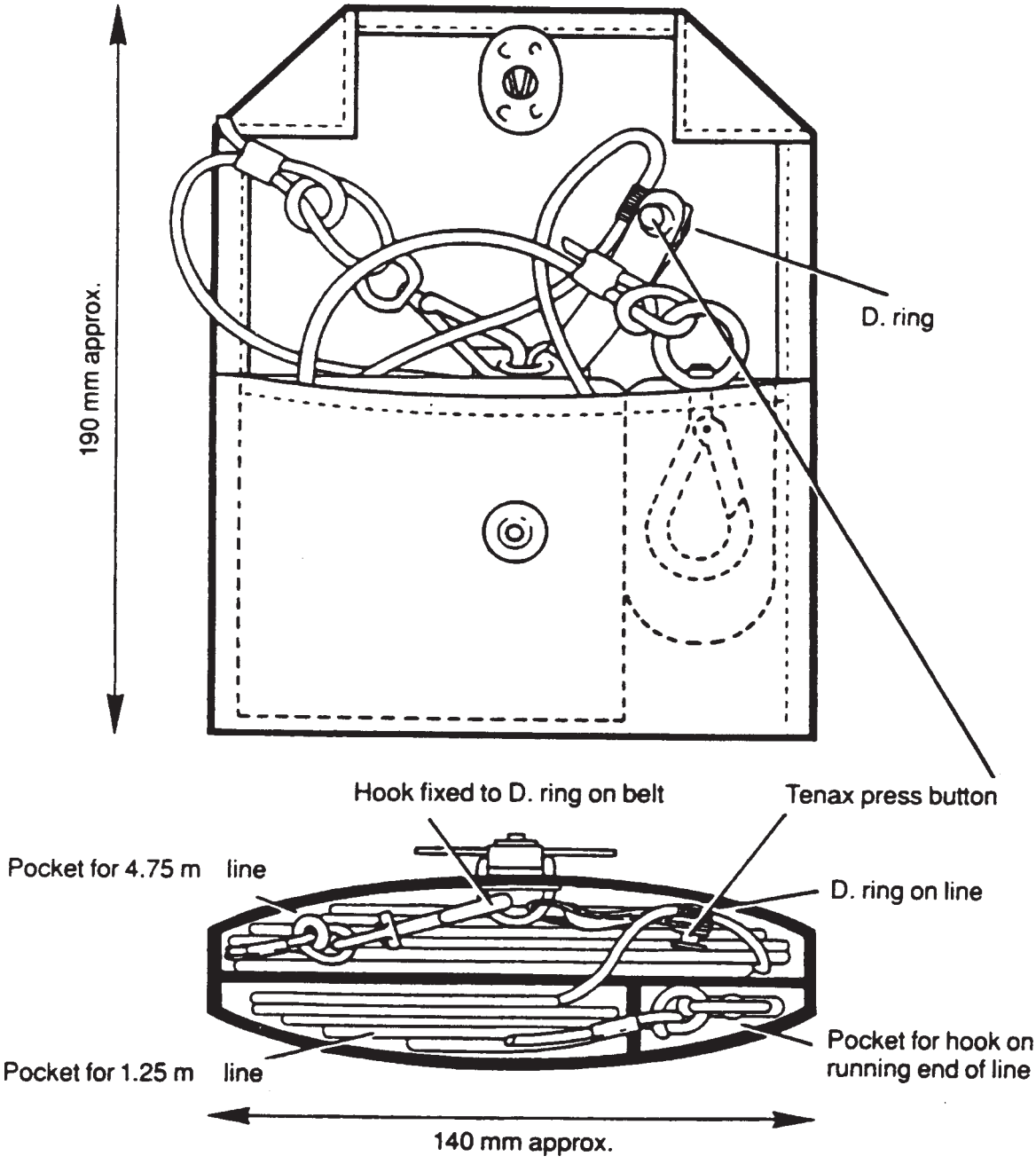
Dimensions are approximate

Appendix 13

Karibiner for Personal Line

Appendix 14

Personal line pouch


190 mm approx.
D. ring
Hook fixed to D. ring on belt
Tenax press button
Pocket for 4.75 m line
D. ring on line
Pocket for hook on running end of line
Pocket for 1.25 m line
140 mm approx.

Appendix 15

AIDES MEMOIRE

Contents

AM1 Duties of Incident Commander

AM2 Duties of Stage I Entry Control Officer

AM3 Duties of Stage II Entry Control Officer

AM4 Duties of BA Main Control Officer

AM5 Distress to Wearer Procedure

Note: The attached Aides Memoire have been developed from samples already in use. Brigades may care to adapt these for local use.

Appendix 15

AM1 Duties of Incident Commander

Phase of Operation	Action	Confirm	Equipment Notes
Initial Attendance	Risk Assessment	Requirement for BA	Use of Guidelines
	Request additional resources	Correct level of PPE	Communications Air line equipment Thermal Imaging Camera
Committing BA teams:			
Level of Control	Rapid Deployment	Limited Resources Immediate deployment	
	Stage I Procedures	Small incident 10 or less BA wearers Not more than 1 (one) ECP	NO BRANCH GUIDELINES
	Stage II Procedures	Protracted incident More than 10 BA wearers More than 1 (one) ECP	Branch Guidelines
Control Procedures	Siting and number of ECPs (delegate if necessary)	Level of Control	Use of guidelines
	Brief teams on task and risks	Equipment checks	Additional equipment requirements
	Communications	Equipment checks	Allocation of radio equipment
Deployment of Teams	Estimate requirement of BA wearers / reliefs	Additional resources	Availability of associated equipment
	Requirement for Emergency Teams	Size and number of team(s)	Equipment to be carried
	Establish criteria for deploying Emergency Teams	If radio communications is lost	
Authorising Re-Entry task	Re-commit BA wearers with less than 80% contents	Clearly defined Cylinder contents sufficient for task No doubt on any BA wearer's fitness	
Completion of Incident	Note all accidents or injuries	All equipment returned	
	Plan debriefing arrangements	All relevant information collected	

Appendix 15

AM2 Duties of Stage I Entry Control Officer

Phase of Operation	Action	Confirm	Equipment Notes
Establish Entry Control Point	Proceed to location indicated by Incident Commander or if delegated choose location of ECP	ECB clock is working Communications with Incident Commander and other ECPs if necessary) Location of other ECPs Equipment	ECB and ancillary Communications equipment (Radio on BA Channel and Radio on Fire Ground Channel Supply First Aid /Resuscitation
Recording Initial Information on ECB	Record Location of ECP Record ECP number Record Stage of Procedure	Radio call-signs	
Entry Procedure	Inspect BA wearers Record information on tallies Record information on ECB	Name of wearer Cylinder pressure "Time In" Dosimeter reading "Time of Whistle" bracket team Team Location Team Task	Radio check (BA Channel) and periodically thereafter Affix tallies to guide lines prior to deployment of team No Branch Guidelines
Emergency Team available	Inspect BA wearers	Size of largest team to enter risk area	Appropriate emergency equipment
Deploy Emergency Team	Inform Incident Commander Carry out entry procedure	A team has not returned by "Time of Whistle" A DSU activation is reported Wearer in distress reported Situation demands	
Sound Evacuation Whistle	On order of Incident Commander	Where situation demands	
On Completion of Duties	Return tallies to wearers Inform Incident Commander when all duties are completed	Dosimeter readings	Remove all guideline tallies

Appendix 15

AM3 Duties of Stage II Entry Control Officer

Phase of Operation	Action	Confirm	Equipment Notes
Establish Entry Control Point	Proceed to location indicated by Incident Commander or if delegated choose location of ECP	ECB clock is working Synchronise clock with other Stage II ECOs Communications with Incident Commander and other ECPs Location of other ECPs Equipment	ECB and ancillary equipment Communications equipment (Radio on BA Channel and Radio on Fire Ground Channel if necessary) Supply First Aid / Resuscitation
Recording Initial Information on ECB	Record Location of ECP Record ECP number Record Stage of Procedure	Radio call-signs	
Entry Procedure	Inspect BA wearers Record information on tallies Record information on ECB	Name of wearer Cylinder pressure "Time In" Dosimeter reading "Time of Whistle" bracket team Team Location Team Task	Radio check (BA Channel) and periodically thereafter Affix tallies to guide lines prior to deployment of team
Emergency Team available	Inspect BA wearers	Size of largest team to enter risk area	Appropriate emergency equipment
Deploy Emergency Team	Inform Incident Commander Carry out entry procedure	A team has not returned by "Time of Whistle" Wearer in distress reported Situation demands	
Sound Evacuation Whistle	On order of Incident Commander	Where situation demands	
On Completion of Duties	Return tallies to wearers Inform Incident Commander when all duties are completed	Dosimeter readings	Remove all guideline tallies

Appendix 15

AM4 Duties of BA Main Control Officer

Phase of Operation	Action	Confirm	Equipment Notes
Establish BA Main Control	Proceed to location indicated by Incident Commander or if delegated choose location of MCP	Accessible to all Stage II ECOs MCB clock is working Synchronise clock with Stage II ECOs Communications with Incident Commander and other ECPs (on-going) Location of other ECPs	MCB and ancillary equipment Vehicle for use as MCP Communications (Radio on BA channel and radio on fire ground channel if necessary) Supply First Aid /Resuscitation Equipment
Recording Initial Information on MCB	Record Location of MCP	Radio call-signs Names ECOs Number and size of BA teams committed Relief required	Radio check (BA Channel) and periodically thereafter
Record Keeping	Update Main Control Board	Availability of BA wearers Availability of BA equipment Availability of BA ancillary equipment Availability of spare cylinders, full and empty	
Liase with Incident Commander	Update Main Control Board	Sufficient fully equipped BA wearers available Collecting and filling of BA cylinders Establishment of bulk stocks of cylinders and stock control Maintenance of used BA sets	
Emergency Team available	Have team at Main Control or at each	Size of largest team to enter risk area ECP	Appropriate emergency equipment
Briefing / Debriefing	Relief teams to be at ECPs 5 minutes before entry	All BA wearers are reporting to BA Main Control	
On Completion of Duties	Inform Incident Commander when all duties are completed	Debriefing of all personnel Arrange relocation of BA equipment and ancillaries	

Appendix 15

AM5 Distress to Wearer Procedure

All distress to wearer situations at an incident or whenever Breathing Apparatus is wrn should be investigated by the Brigade and may be reportable to the HSA.

Phase of Operation	Action	Confirm	Equipment Notes
Distress to wearer reported	Appoint competent person to apply distress to wearer procedure		
	Immediately impound the BA set		
	Complete all necessary paperwork prescribed by the Brigade		
	Place BA set in a plastic bag or other receptacle, seal and label		
	Inform the Incident Commander and Mobilising Control		
	Secure BA set in a safe place until the distress to wearer situation can be fully investigated		

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